



Brighter strategies
for greener projects



Client: Formation Design and Build Ltd
Project: Cranwood House
Report: Ecological Management Plan

QUALITY ASSURANCE

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1.0 EXECUTIVE SUMMARY

Greengage Environmental Ltd was commissioned by Formation Design and Build Ltd to produce an Ecological Management Plan (EMP) to cover a period of five years for Cranwood House, in the London Borough of Haringey.

The granted planning application (HGY/2021/2727) for site includes full planning permission for the redevelopment of the site by demolishing the existing care home building to deliver 41 homes with a mix of one, two and three-bedroom apartments, maisonettes and house.

This document has been produced to address condition 21 of the planning consent (ref: HGY/2021/2727) for the proposed development at the site. The condition states:

"21) (a) Prior to the commencement of development, the recommendations of the approved Preliminary Ecological Appraisal (PEA, p17-19) shall be complied with, and details submitted to and approved in writing by the Council. For the avoidance of doubt these recommendations and submissions shall include:

- i. Demolition, Construction and Environmental Management Plan (as per para 5.2 of the PEA) for the Council's written approval, in consultation with the City of London, prior to the commencement of works on site (including demolition);*
- ii. Sensitive Lighting Strategy (as per para 5.3 of the PEA);*
- iii. Further bat surveys (as per paras 5.4-5.6 of the PEA) and consideration of and mitigation for any changes to bat commuting routes;*
- iv. Seasonal clearance of vegetation outside of the bird nesting season (March to August inclusive) (as per para 5.7 of the PEA);*
- v. Ensure conservation of hedgehogs during clearance of vegetation (as per paras 5.10-5.11 of the PEA);*
- vi. Ecological Management Plan that provides habitats for priority species within the scheme landscaping (as per paras 5.12-5.13 of the PEA), including a demonstration of biodiversity net gain and justification for the location and type of enhancement measures by a qualified ecologist, for the Council's written approval prior to the commencement of works on site.*

The development must be completed in accordance with the approved details.

(b) Prior to occupation of development, photographic evidence and a post-development ecological field survey and impact assessment shall be submitted to and approved by the Local Planning Authority to demonstrate the delivery of the ecological enhancement and protection measures is in accordance with the approved measures and in accordance with CIEEM standards.

Development shall accord with the details as approved and retained for the lifetime of the development."

Specifically, this document will address the requirements of part a) vi of the condition:

"Ecological Management Plan that provides habitats for priority species within the scheme landscaping (as per paras 5.12-5.13 of the PEA), including a demonstration of biodiversity net gain and justification for the

location and type of enhancement measures by a qualified ecologist, for the Council's written approval prior to the commencement of works on site."

The baseline ecological assessment determined the existing site to be comprised of buildings, hardstanding, modified grassland, introduced shrub, ruderal vegetation and broadleaved woodland. The habitats were identified as having potential to support the following protected/notable species:

- Low to moderate potential to support roosting bats;
- High potential to support foraging and commuting bats;
- High potential to support nesting birds; and
- Moderate potential to support hedgehogs.

Further bat emergence surveys were completed in 2019 and 2022 and have confirmed the likely absence of roosting bats from all buildings on site.

The results of the PEA and further bat surveys identified a number of opportunities to enhance the site were identified through the detailed design evolution to complement the landscaping, building use and wider green infrastructure assets.

Enhancements for the site include living roofs, woodland planting, wildlife friendly planting, integrated bird and bat boxes in buildings across the site, hanging bird boxes in trees, invertebrate features and on-going wildlife sensitive management.

A net gain of 25.67% in ecological value will be delivered in the medium to longer terms as a result of the proposed ecological enhancements and site management. Monitoring of the recommended management of the site for biodiversity will occur frequently as will ecological surveys for bats, birds and insects so that remedial actions can be performed accordingly.

2.0 INTRODUCTION

Greengage was commissioned by Formation Design and Build Ltd to produce an EMP, to cover a period of five years, detailing specifications for ecological enhancement features for Cranwood House, in the London Borough of Haringey, in order to discharge the ecology related condition on the schedule (planning permission ref: HGY/2021/2727).

2.1 PLANNING CONDITIONS

This document has been produced to address the requirements of Condition 21 (a) vi of the planning consent.

The full wording of Condition 21 is provided below:

"21) (a) Prior to the commencement of development, the recommendations of the approved Preliminary Ecological Appraisal (PEA, p17-19) shall be complied with, and details submitted to and approved in writing by the Council. For the avoidance of doubt these recommendations and submissions shall include:

- i. Demolition, Construction and Environmental Management Plan (as per para 5.2 of the PEA) for the Council's written approval, in consultation with the City of London, prior to the commencement of works on site (including demolition);
- ii. Sensitive Lighting Strategy (as per para 5.3 of the PEA);
- iii. Further bat surveys (as per paras 5.4-5.6 of the PEA) and consideration of and mitigation for any changes to bat commuting routes;
- iv. Seasonal clearance of vegetation outside of the bird nesting season (March to August inclusive) (as per para 5.7 of the PEA);
- v. Ensure conservation of hedgehogs during clearance of vegetation (as per paras 5.10-5.11 of the PEA);
- vi. Ecological Management Plan that provides habitats for priority species within the scheme landscaping (as per paras 5.12-5.13 of the PEA), including a demonstration of biodiversity net gain and justification for the location and type of enhancement measures by a qualified ecologist, for the Council's written approval prior to the commencement of works on site.

The development must be completed in accordance with the approved details.

(b) Prior to occupation of development, photographic evidence and a post-development ecological field survey and impact assessment shall be submitted to and approved by the Local Planning Authority to demonstrate the delivery of the ecological enhancement and protection measures is in accordance with the approved measures and in accordance with CIEEM standards.

Development shall accord with the details as approved and retained for the lifetime of the development."

2.2 AIMS AND OBJECTIVES

This document aims to collate the site-wide ecological design concepts and future monitoring and management regime at the site.

Enhancements are targeted at specific ecological receptors of note, known to be in the area, reflecting contemporary best practice and objectives of local conservation groups, Biodiversity Action Plans (BAPs) and planning policy.

Detailed specifications for the biodiverse roof, wildlife friendly landscaping, bird nest boxes and bat boxes have been provided. Details on the construction method and biodiverse roof layouts and location are also included.

Works described in this report will be carried out at specific times throughout the installation process supervised by a suitably qualified ecologist. Otherwise installation works will be undertaken by a specialist contractor with reference to this strategy.

A management plan sets out measures for the successful establishment and long-term management and monitoring of the biodiverse roof and enhancement features.

The ecological enhancements specified will positively contribute to enhancing the ecological and wildlife value of the site, meet objectives of planning permission conditions and complement local and regional BAPs.

2.3 PROPOSALS

Full planning permission has been granted for the redevelopment of the site by demolishing the existing care home building to deliver 41 homes with a mix of one, two and three-bedroom apartments, maisonettes and houses. Collectively known as Cranwood, this development will be split across three new buildings built around a landscaped courtyard amenity space. Building A (6 storeys) will be accessed from Woodside Avenue while Building B (4 storeys) and Building C (3 storeys) will be accessed from a newly created access road off Woodside Avenue. Building A accommodates 16 apartments and 16 maisonettes, Building B 9 apartments and Building C 2 townhouses. The development will also provide a stepped public access to the Parkland Walk on the corner of Muswell Hill Road and Woodside Avenue.

2.4 SITE LOCATION AND DESCRIPTION

The site is situated at the junction between Woodside Avenue and Muswell Hill Road in Haringey. It has a central OS national grid reference of TQ 28428 89147. The surrounding land use is comprised of residential properties beyond Woodside Avenue to the north and Muswell Hill Road to the east. St James C of E Primary School is located to the west of the site and Highgate Wood is located to the south.

The site is comprised of two main areas. The northern area is a disused residential care home, with a small parking area to the west and landscaped gardens in the centre and along the northern/eastern

property boundaries. The southern area comprises two terraces of houses with private gardens to the south, and a parking area to the west.

Trees are located throughout the site, with the largest specimens concentrated along the eastern, southern and western site boundaries.

3.0 ECOLOGICAL BACKGROUND

3.1 BASELINE CONDITIONS

The site has been subject to a Preliminary Ecological Appraisal (PEA) and bat survey in 2019 both undertaken by Greengage to accompany the original planning application. An updated bat survey was undertaken in 2022 in relation to part a) iii of the planning condition. Findings from these surveys are presented in the following reports and this document should be read in conjunction with these:

- PEA, Greengage (2019) (doc ref: 551337ogOct19FV01_PEA);
- Bat survey, Greengage (2019) (doc ref: 551337ogJan20FV02_Bats); and
- Bat survey, Greengage (2022) (doc ref: 551718sm10Aug22FV01_Bats).

The key findings of the ecology surveys are summarised below.

PEA

The PEA identified that the habitats on site are all common and widespread and included buildings, hardstanding, modified grassland, introduced shrub, ruderal vegetation and broadleaved woodland. The habitats were identified as having potential to support the following protected/notable species:

- Low to moderate potential to support roosting bats;
- High potential to support foraging and commuting bats;
- High potential to support nesting birds; and
- Moderate potential to support hedgehogs.

The southern boundary of the site is also situated adjacent to Highgate Woods, a Metropolitan Site of Importance for Nature Conservation. These woods were identified as having high potential to support foraging, commuting and roosting bats.

2019 Bat survey

As part of the PEA, a preliminary roost assessment identified that the nursing/care home had low potential to support roosting bats. A single dusk emergence survey on the building was undertaken in September 2019 which concluded roosting bats were likely-absent from the building. A row of terrace houses was included in these surveys and the presence of a bat roost was recorded, however, these terraced houses were later removed from the proposals.

2022 Bat survey

Given the time between the 2019 survey and the proposed demolition date, following the granting of planning permission, an updated survey of the nursing/care home was undertaken in June and July 2022. Two emergence surveys confirmed the 2019 survey results, identifying likely absence of roosting bats in the building. However, moderate levels of commuting and foraging activity were recorded from

two species, common pipistrelle (*Pipistrellus pipistrellus*) and soprano pipistrelle (*Pipistrellus pygmaeus*), with passes (heard not seen) recorded from a further two species, *Myotis* (*Myotis* sp.) and nathusius' pipistrelle (*Pipistrellus nathusii*).

3.2 BIODIVERSITY ACTION PLANS (BAP)

In accordance with the aims and objectives of this document a review of the relevant biodiversity action plans and local conservation targets was undertaken. This review, along with the results of the PEA and bat surveys, is then able to form the context for ecological enhancement at the site.

UK Biodiversity Action Plans (BAPs) have been developed which set priorities for nationally important habitats and species. To support the BAPs, Species/Habitat Statements (otherwise known as Species/Habitat Action Plans) were produced that provide an overview of the status of the species and set out the broad policies that can be developed to conserve them. A list of priority species of conservation importance was also developed.

The UK BAP was succeeded in 2012 by the UK-Post 2012 Biodiversity Framework which informed the creation of the Biodiversity 2020 strategy; England's contribution towards the UK's commitments under the United Nations Convention of Biological Diversity.

Despite this, the UK BAP priority species lists and conservation objectives still remain valid through integration with local BAPs (which remain valid), and in the form of the Habitats and Species of Principle Importance list (as required under section 41 of the Natural Environment and Rural Communities (NERC) Act).

Local Biodiversity Action Plans (LBAPs) ensure that national action plans (the UK BAP/Biodiversity 2020) are translated into effective action at the local level, and establish targets and actions for locally characteristic species and habitats.

The site is subject to the London BAP and Haringey BAP¹ which define key habitats and taxa/species of regional and local conservation interest. Receptors of relevance to this strategy which should accordingly be considered within the scheme design are summarised in Table 3.1 below.

Table 3.1 London and Haringey BAP Key Habitats and Species of Relevance to this Site

Priority habitats/species	Local objectives of relevant BAPS and policy	Objectives for this strategy
Built Environment	London: • Include biodiverse green roofs which meet the definition of open mosaic habitats on all new developments; • Include living walls with nectar-rich climbers in new development; • Include green sustainable drainage systems in new development to avoid reliance on hard engineered drainage infrastructure; • Provide nature rich amenity space in new development; • Incorporate roost sites for bats within the design of new buildings; • Install internal and external nest boxes for Swifts, House sparrows, and Black redstarts in appropriate places on new buildings; • Use native plants and trees in landscaping schemes;	• Enhance the site further to the benefit of biodiversity by providing integrated green infrastructure features, e.g. wildlife friendly landscaping, introduced shrub, woodland planting and biodiverse roofs. • The development proposals include biodiverse living roof, wildlife friendly landscaping, house sparrow and bat boxes which will provide foraging and nesting/roosting opportunities for the following Haringey and London BAP species: ○ Bats; and ○ House sparrow • The development will incorporate vegetated rain gardens that will provide water storage and flood alleviation measures, whilst providing foraging habitat for invertebrates.
Parks and Greenspaces	London: • To share best practice and provide a forum for public space managers interested in furthering biodiversity. • To promote values and benefits of biodiversity in public spaces. Haringey:	• Provide communal areas for residents that are nature rich, with a mix of native and non-native species that are known to benefit biodiversity. • Provide a management plan that will encourage good conservation practices so that the landscaping and enhancement features are functioning as well as possible for wildlife.

Priority habitats/species	Local objectives of relevant BAPS and policy	Objectives for this strategy
	- To encourage good conservation practice in parks and green spaces across Haringey, respecting their varied functions and the aspiration of local communities. - To improve access to nature in Haringey's parks and green spaces, particularly in areas of deficiency in access to a natural green space.	
Gardens	Haringey: - To highlight and protect the overall resource for wildlife provided by gardens (public and private) and housing estate land; - To improve individual gardens and housing estate land as habitat for a range of local wildlife	The development will provide communal and private garden spaces for residents that is sensitive to the surrounding landscape and provide an increase in resource of good quality habitat for wildlife.
Woodland	Haringey: - To conserve and enhance Haringey's woodland for the benefit of biodiversity and for both the current and future generations of people. - To increase the area woodland in Haringey, particularly in areas where there is little accessible woodland.	- The development aims to retain and enhance the existing woodland on site; - The development will be constructed sensitively to protect all existing and retained woodland on site and associated with Highgate Wood Site of Importance for Nature Conservation (SINC).
Bats	London: Raise and maintain awareness of bat conservation issues within key sectors (specifically planners, land managers and tree and building contractors) by advancing a targeted programme of relevant best practice advice.	- The development will provide foraging resources by encouraging a range of invertebrate prey to habitats on site. - It will provide roosting opportunities in the form of bat boxes built into the new buildings.

Priority habitats/species	Local objectives of relevant BAPS and policy	Objectives for this strategy
	• Increase Londoner's awareness of and involvement in bat conservation. • Increase knowledge of bat distribution and population changes in Greater London. Haringey: • To help reverse the current population decline in bats. • To redress public misconceptions about bats and secure their status as culturally valued animals.	• External lighting will be designed in a sensitive way to ensure that new artificial lighting doesn't result in a negative impact on bats.
House Sparrow	London: • Raise awareness of the need for biodiversity conservation by focussing attention on the decline in the house sparrow and its importance as a cultural emblem. • Establish the cause(s) of decline in the population of house sparrows and if possible undertake measures to reverse the decline.	• There will be new provision of foraging resources through native shrub and tree planting of fruit and berry producing species, as well as an increase in invertebrate assemblages. • Provision of nesting opportunities in the form of house sparrow terrace boxes will be integrated within the built form on site.

3.3 COMPETENCIES

Stephanie Harper, who reviewed this report, has a BSC (Hons) and PhD in Environmental Sciences, a Natural England level 1 class bat licence and over 15 years' experience in ecological surveying.

Sam Barker has an undergraduate degree in Environmental Science (BSc Hons), holds a Natural England Great Crested Newt Licence and is an Associate member of CIEEM. Sam has over five years' experience of undertaking and managing a range of ecological surveys and assessments.

This report was written by Sam Barker and reviewed and verified by Stephanie Harper who confirms in writing (see the QA sheet at the front 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.

4.0 MITIGATION STRATEGIES

The following section discusses appropriate mitigation measures for each receptor identified at the site or within influencing distance. Where compensation and / or enhancement are appropriate, these have also been briefly mentioned.

4.1 HABITATS

Highgate Woods Site of Importance for Nature Conservation (SINC) is adjacent to the southern boundary of the site, with woodland and trees present on site.

The majority of the on-site habitats have been lost to development although some trees along the eastern boundary are retained.

Mitigation

In the absence of mitigation, habitats retained onsite and offsite adjacent (associated with Highgate Woods SINC) could be subject to disturbance through damage by machinery of trees and their roots, subject to increased levels of pollution such as dust deposition, noise, vibration and sediment run-off during construction.

The following control measures and management actions will be fully complied with to avoid and mitigate potential impacts on these habitats and the SINC during site construction.

Tree Protection

Works around retained trees and within proximity to the SINC will be undertaken in accordance with the Tree Constraints Plan (TCP) and Roots Protection Areas (RPA) provided in Appendix 3 of the Arboricultural Impact Assessment (doc ref: 55178jr28June21FV02_AIA).

Care and vigilance must be taken to avoid crown and stem damage when working with machinery near the retained trees. Plant machinery with booms, jibs and counterweights/tall or wide loads should be controlled by banksman to maintain adequate clearance from tree crowns. The TCP is provided at Appendix A.

Noise and Vibration

Table 4.1 below outlines noise and vibration issues requiring attention and identifies the control measures to be implemented.

Table 4.1 Noise and vibration management

Noise and Vibration	Control measure
Site set-up and operating hours	Normal working hours will be 08:00 - 18:00 Monday to Friday, and 09:00 - 13:00 Saturday

Noise and Vibration	Control measure
Construction traffic (delivery vehicles, site personnel etc.)	All goods, equipment, plant and materials will be transported by road. Delivery times will be planned to minimise potential nuisance to the local community.
Construction plant and equipment	Site compounds to be sited in the far north of the site, at least 30m away from the SINC with fencing/barriers to prevent encroachment by unauthorised vehicles. Any static plant to be sited within the fenced off compound with plant and equipment switched off when not in use. Plant and equipment will be maintained and operated in accordance with operators instructions.

Materials and Waste

Table 4.2 below outlines the materials and waste issues requiring attention and identifies the control measures to be implemented.

Table 4.2 Materials and waste management

Materials and waste	Control measure
Storage, handling and management of materials and waste	Materials and waste are to be stored in a commercial skip sited within the works compound before removal from site. Waste containers to be securely covered to ensure wastes cannot be blown or washed away. Any oils, fuels and liquids used are to be securely stored within the site compound (storage to include bunding and tamper proof and lockable valves, where appropriate. Spill kits to be located near to the works areas and within storage compounds, with personnel being trained in their use.
Waste disposal strategy	Where on-site recycling is not feasible, the contractor will identify opportunities for recycling the demolition materials through a recycling contractor or in other external projects. Other domestic waste shall be disposed of daily.

Air Quality, Dust and Emissions

Table 4.3 outlines the air quality, dust and emissions issues requiring attention and identifies the control measures to be implemented.

Table 4.3 Air quality, dust and emissions management

Air quality, dust and emissions	Control measures
Site set-up and operation	Use of debris shields/mesh around all sides of the construction zone
Air quality and emissions	Vehicles, plant and equipment on site to be well maintained and serviced. Vehicles, plant and equipment to be switched off when not in use.
Dust/debris	Manual road/path sweeping to be employed to remove excess build-up of material, as appropriate. Any dust generating materials transported to and from site to be securely covered. Any dust generating materials on site to be located out of the wind, screened or covered.
Monitoring	Regular visual checks for dust, debris and emissions arising to be undertaken across the site and log of results maintained.

Compensation

Compensatory tree and woodland planting has been included within the landscaping proposals and described in Section 5.2 below.

4.2 FORAGING BATS

Mitigation

Protection and retained features

The SINC and any retained trees will be protected during construction (Section 4.1 above) thus preserving bat activity corridors.

Bat Sensitive Light Strategy

During construction

It is understood that construction works will be undertaken during daylight hours. Should any artificial lighting be required it will follow the Institute of Lighting Professionals (ILP) and Bat Conservation Trust (BCT) guidance². The lighting will be installed to face away from the SINC and retained trees, so as not to cause unnecessary light spill onto these sensitive areas. There will be no uncontrolled lighting and the lighting will be switched off when not in use.

During operation

Bat-sensitive lighting should be incorporated into the scheme to minimise any potential impacts of increased lighting levels on foraging, commuting and socialising bats. Lighting should follow guidance provided by the ILP and BCT². This involves the use of low-UV warm-white LED bulbs with directional,

downward facing and shielded lights which point away from green features such as tree lines or areas of planting. External lights should be subject to curfew controls where possible with lights on movement sensors to reduce light pollution when not needed. Open green space (including any living roofs) should remain unlit, particularly between April and October, inclusive. Measures should be taken in internal light placement to reduce risk of light spill from windows, as per guidelines. Lighting at site should be modelled to confirm predicted intensity and spill.

Compensation

Compensatory tree and woodland planting has been included within the landscaping proposals and described in Section 5.2 below.

Enhancement

Additional biodiverse roofs, tree planting, wildlife friendly planting and rain gardens will increase the invertebrate prey available on site and therefore increase the foraging value of site for bats.

4.3 NESTING BIRDS

Mitigation

Timing of Works

It is our understanding that the existing buildings have already been demolished at the time of writing, but the trees are still standing. As the removal of these trees and ruderal vegetation will likely be within the bird nesting season (taken to run from March to August inclusive), a nesting bird check by a suitably qualified ecologist (SQE) is required prior to any clearance of this vegetation. Should an active nest be identified, works around the nest must cease and the SQE be contacted to provide appropriate advice.

Enhancement

Additional nest boxes have been recommended to be included within the proposals. New woodland and shrub planting will also provide suitable nesting habitat for birds.

4.4 HEDGEHOG

Mitigation

Construction

The majority of the suitable woodland and ruderal habitat will be cleared. Clearance will be undertaken during March and therefore within the active season for hedgehog. Clearance of ruderal and any understorey vegetation should be undertaken following a precautionary phased cut method. Where accessible the vegetation will be checked initially for any hedgehog, the vegetation will then be cut to 30cm and then down to ground level, with a check between the cuts by a suitably qualified ecologist.

Site fencing should have gaps left at the base to allow small mammals to traverse the site without getting trapped.

Excavations should be covered overnight where practicable, with a means of escape such as wooden planks that could be used as a ladder set in place, or excavations should be profiled so as to enable mammals to escape.

Operation

During operation, new fencing (particularly along the boundary with the SINC) should have gaps left at the base to allow small mammals to move between the site and the wider landscape.

Compensation

Compensatory woodland and shrub planting has been included to provide foraging and habitat within the landscaping proposals and described in Section 5.2 below.

Enhancement

Hedgehog nesting boxes will be provided within the new woodland, to provide hibernation opportunities.

5.0 ECOLOGICAL ENHANCEMENTS

5.1 OVERVIEW

The proposed development provides the potential to enhance the biodiversity value of the site. This will primarily be achieved by the introduction of features within the landscaping proposals and actions within the long-term management regime for the site, targeting specific ecological receptors.

The creation of specific habitats and attraction of notable and protected ecological receptors will complement the targets of national and local policy and BAPs.

Specifically, the proposals will seek to enhance the on-site habitat for the following species:

- Foraging and roosting bats (UK and local BAP priority species);
- Birds (house sparrow);
- Hedgehog; and
- Invertebrates (including targeted Lepidoptera species through the inclusion of larval and nectar plants, and solitary bees and wasps through provision of burrowing habitat).

The following enhancements are to be included at the site:

- Wildlife-friendly landscape planting –including woodland, tree and herbaceous planting, all to be managed sensitively for wildlife;
- Living roof areas - substrate based biodiverse roof with invertebrate enhancement features (sandy piles, log piles, rope coils and stone circles) where appropriate;
- Further invertebrate features such as bee bricks and hotels;
- Stag beetle loggeries;
- Bird and bat boxes; and
- Hedgehog nest boxes.

Detail on these features and specifications are provided in the chapter below.

5.2 WILDLIFE FRIENDLY LANDSCAPING

It is understood that the communal grounds around the new buildings will include woodland planting, rain gardens, areas of ornamental shrub planting and native shrub planting.

Where possible, native plant species or species that are of value to pollinators (e.g. those listed on the RHS Plants for Pollinators³) will be incorporated into landscape design at site. The types and areas of landscaping is shown at Appendix A.

Woodland planting

New woodland planting is to be provided around the eastern and southern boundaries of the site, to compensate the loss of the existing woodland and trees. The woodland would provide habitat variety, foraging and commuting habitat for bats, birds and shelter and nest building opportunities for small mammals, birds and invertebrates. Tree and shrub species that are to be incorporated into the woodland mix include:

- Silver birch (*Betula pendula*);
- Oak (*Quercus robur*);
- Lime (*Tilia cordata* 'greenspire');
- Hornbeam (*Carpinus betulus* 'lucas');
- Japanese rowan (*Sorbus commixta*);
- Wild service tree (*Sorbus torminalis*);
- Hazel (*Corylus avellana*); and
- Cherry (*Prunus avium*).

Understorey species include:

- Hard fern (*Blechnum spicant*);
- Scaly male fern (*Dryopteris affinis* 'Cristata');
- Snowdrop (*Galanthus nivalis*);
- Herb robert (*Geranium robertianum*);
- Bluebell (*Hyacinthoides non-scripta*);
- Primrose (*Primula vulgaris*);
- Greater stitchwort (*Stellaria holostea*); and
- Woodland germander (*Teucrium scorodonia*).

Rain garden

Large sections of the planting around the amenity grassland and along the access roads are to be rain gardens. Species incorporated into the rain gardens include:

- Yarrow (*Achillea millefolium*);
- Bugle (*Ajuga reptans*);
- Black knapweed (*Centaurea nigra*);
- Viper's bugloss (*Echium vulgare*);
- Hemp agrimony (*Eutrochium cannabinum*);

- Stinking hellebore (*Helleborus foetidus*);
- Siberian iris (*Iris sibirica*);
- Soft rush (*Juncus effusus*);
- Switchgrass (*Panicum virgatum*);
- Culver's root (*Veronicastrum virginicum*).

Native and ornamental shrubs

Native and ornamental shrub planting will be incorporated around the boundaries of the site and in high visibility areas. Species will include a mix of native and non-native species including:

- Hornbeam;
- Hawthorn (*Crataegus monogyna*);
- Blackthorn (*Prunus spinosa*);
- African lilly (*Agapanthus campanulatus albidus*);
- Alium (*Alium sphaerocephalon*);
- Calycanthus x raulstonii 'Hartlage Wine';
- Purple coneflower (*Echinacea purpurea*);
- Common fennel (*Foeniculum vulgare*);
- Dusky cranesbill (*Geranium phaeum*);
- *Libertia grandiflora*;
- Chinese silver grass (*Miscanthus sinensis* 'Gracillimus');
- Korean mountain burnet (*Sanguisorba hakusanensis* 'Lilac squirrel');
- Autumn moor grass (*Sesleria autumnalis*);
- Holly-leaved barberry (*Mahonia aquifolium*);
- Sweet box (*Sarcococca confusa*);
- *Skimmia japonica* 'Kew Green';
- *Camassia leichtlinii* 'Alba';
- *Escallonia* 'Glowing embers';
- *Geranium* 'Ann folkard';
- *Mahonia eurybracteata* subsp. *ganpinensis* 'Soft caress';
- Lady's mantle (*Alchemilla mollis*);
- Male fern (*Dryopteris filix-mas*);

- Black hellebore (*Helleborus nigra*);
- Snowy wood-rush; and
- Guelder rose (*Viburnum opulus* 'Compactum').

The above soft landscaping will make a small contribution to biodiversity at the site through provision of nectar and pollen resources for pollinators, nesting habitat and a food resource for birds and foraging habitat for bats that may be present in the area, among other taxa.

Horticultural Best Practice

The landscaped areas will require maintenance once established. The use of pesticides (herbicides, insecticides, fungicides and slug pellets) should be discouraged to prevent changes to the food chain, particularly on invertebrates, birds and/or mammals.

5.3 BIODIVERSE ROOF

The extensive living roof will be a substrate based biodiverse system plug planted and seeded with suitable species. A total of 8m² of biodiverse roof will be installed at the proposed development on the bin stores in the south of the site.

Substrate specification

At least three industry-standard substrate types will be used on the biodiverse roof in order to improve habitat heterogeneity and increase ecological niche provision. The different substrate types will be 'patterned' to create habitat structure for invertebrates and aesthetic interest. Organic content will be kept below 20% in all substrates. The three substrate types will include:

- One substrate will be a 'typical' biodiverse substrate designed for extensive living roofs, composed of recycled crushed brick, expanded clay shale and recycled organic content. Bauder's Biodiverse substrate⁴ is a suitable product.
- One substrate will be composed of pebbles/Caledonia cobbles of roughly 40-120mm size mixed with the biodiverse roof substrate;
- One substrate will be a finer gravel/sandy substrate.

Substrate depths should vary across rooftops between 120-200mm to ensure suitable retention of water and embed resilience for future climate risks, including longer and more frequent periods of drought, see Figure 5.1.

Figure 5.1 Example substrate type and planting variation on biodiverse roofs (please note depths shown are not those specified for this site)



Species/Seed Mixes

Due to the unpredictable nature of colonisation and its dependence on plant propagules in the area, the low-nutrient substrate will be seeded and plug planted with a suite of native species of known value for the targeted ecological receptors. The diverse mix of species increases the flowering period, increasing the availability of nectar for pollinators throughout the year. Seed mixes and species composition will vary across the roof depending on substrate types.

Seeds will be sown at a rate of 5g/m² with plugs planted at a density of 15-20/m² with a minimum root ball of 25cm³.

Suitable seed mixes can be procured from a variety of retailers that are tailored for exposed, low-nutrient conditions on roof tops. Bauder's Flora 3 Seed Mix⁵ contains 49 species including 35 wildflowers on the RHS Perfect for Pollinators list. The diverse mix of species increases the flowering

period, increasing the availability of nectar for pollinators throughout the year. This seed mix, or similar products from other suppliers, should be used on the biodiverse substrate areas.

Table 4.1 below gives suitable species for each of the substrate types.

These species are selected for their suitability to well-drained substrates (being ideally for 'rockery' type planting which would be recreated in the cobbled areas) as well as their biodiversity value.

Table 5.1 Guide to suitable species for extensive biodiverse roof

Common name	Scientific name
Fine to medium aggregate areas	
Yarrow	<i>Achillea millefolium</i>
Agrimony	<i>Agrimonia eupatoria</i>
Kidney Vetch	<i>Anthyllis vulneraria</i>
Thrift	<i>Armeria maritima</i>
Common daisy	<i>Bellis perennis</i>
Common Knapweed	<i>Centaurea nigra</i>
Viper's Bugloss	<i>Echium vulgare</i>
Blue fleabane	<i>Erigeron acer</i>
Dropwort	<i>Filipendula vulgaris</i>
Lady's Bedstraw	<i>Galium verum</i>
Common Rock-rose	<i>Helianthemum nummularium</i>
Perforate St John's Wort	<i>Hypericum perforatum</i>
Common cat's-ear	<i>Hypochaeris radicata</i>
Wild Candytuft	<i>Iberis amara</i>
Field Scabious	<i>Knautia arvensis</i>
Rough Hawkbit	<i>Leontodon hispidus</i>
Oxeye Daisy	<i>Leucanthemum vulgare</i>
Birdsfoot Trefoil	<i>Lotus corniculatus</i>
Mellilots	<i>Melilotus spp</i>
Wild Marjoram	<i>Origanum vulgare</i>
Hoary Plantain	<i>Plantago media</i>
Salad Burnet	<i>Sanguisorba minor</i>
Cowslip	<i>Primula veris</i>
Selfheal	<i>Prunella vulgaris</i>
White stonecrop	<i>Sedum album</i>
Bladder Campion	<i>Silene vulgaris</i>

Common name	Scientific name
Red clover	<i>Trifolium pratense</i>
Dark Mullein	<i>Verbascum nigrum</i>
Wild pansy	<i>Viola tricolor</i>
Free draining cobble dominated substrate	
Sea thrift	<i>Armeria maritima</i>
South American vervain	<i>Verbena bonariensis</i>
Great mullein	<i>Verbascum thapsus</i>
Yarrow	<i>Achillea</i> spp.
Lesser calamint	<i>Calamintha nepeta</i>
Common primrose	<i>Primula vulgaris</i>
Mother-of-Thyme	<i>Thymus polytrichus</i>
Small scabious	<i>Scabiosa columbaria</i>
Bugle	<i>Ajuga reptans</i>
Biting stonecrop	<i>Sedum acre</i>
Mexican fleabane	<i>Erigeron karvinskianus</i>
Maiden pink	<i>Dianthus deltoides</i>
Rock rose	<i>Cistus x purpureus</i>
Sticky catchfly	<i>Silene viscaria</i>
Common wallflower	<i>Erysimum cheiri</i>

Invertebrate Habitat Features

A range of invertebrate habitat structures have been recommended for incorporation onto the biodiverse roofs to provide habitats suitable for invertebrates and further increase the range of micro niches and biodiversity. Given the size of the biodiverse roofs it is considered that sandy piles and stone swirls will be integrated into the biodiverse roof to enhance its value for invertebrates and provide aesthetic interest.

It is recommended that a minimum of one of each enhancement feature described below is provided on each biodiverse roof area.

Sandy piles

Many species of burrowing solitary bees and wasps require sandy areas to burrow and nest. Provision of sandy piles provides nesting opportunities for such invertebrates within close proximity of a foraging resource. One sandy pile will be incorporated on each area of biodiverse roof. It will be compacted to form a sandcastle effect, and be 50cm high covering one square metre, with 30° angled sides. Rocks and stones may be placed on the surface to increase stability, see Figure 4.2.

Figure 5.2 Sandy piles on biodiverse roof



Installation

Issues with living roofs most commonly occur as a consequence of poor installation. With this in mind only experienced, suitably qualified and dedicated living roof providers should be used for the living roof install. The provider will be given all plans relating to the design of specific roofs as well as this Design Guide document.

As per guidance in the GRO code, the following 4 steps should be followed prior to the planting of roofs:

1. Prior to installation of the planting, the substrate, drainage layer and any moisture mat should be saturated;
2. Pre-water the plants before removing them from their trays;
3. Insert plants and gently water them in; and
4. Ensure that the substrate is irrigated for an initial period of 4-6 weeks to allow the plants to sufficiently establish themselves.

Maintenance and Monitoring

Extensive biodiverse roofs should require little maintenance following initial install and irrigation during establishment.

A single inspection should be undertaken annually. Drainage outlets should be inspected and cleared where necessary, nuisance species such as Buddleja (species listed on the London Invasive Species Index LISI) or Canadian fleabane (*Erigeron canadensis*) should be removed.

5.4 BEE BRICKS/HOUSES

Three bee boxes will be integrated within the soft landscaping in sunny, exposed areas on southern aspects between 1-2m from ground level. They should only be incorporated near soft landscaping areas which provide nectar sources within close proximity. Examples of bee houses are provided in Figure 5.3.

Figure 5.3 Examples of bee bricks/houses



5.5 STAG BEETLE (LUCANUS CERVUS) LOGGERIES

Given the proximity of deciduous woodland, south-west of the site and the newly created woodland habitat on site, one loggery for saproxylic species such as stag beetle will be incorporated within the new woodland area.

A log pile and buried wood/stumps will be created using logs from broadleaved trees that are felled as part of the clearance of the site. Logs should be varied in size but be at least 15cm in diameter and placed on their ends in a 'pyramid' shape with at least 50cm of the logs buried underground and some of the log left visible above ground.

Figure 5.4 Examples of beetle loggeries.



5.6 BIRD AND BAT BOXES

The inclusion of the living roof and areas of soft landscaping will stand to provide good foraging habitat for bats and birds and may act to encourage them to the site. There are opportunities to provide nest boxes for Haringey BAP priority bird species including house sparrows and for bats within the scheme.

Four generalist bird boxes should be hung on retained trees on the site, in particular within woodland areas. These should be east facing and at least 2m high.

Six house sparrow terraces should be integrated within the fabric of the buildings, two for each building, at least 2m high. These should be grouped together.

Figure 5.5 Example bird boxes



In addition to the bird boxes, four bat boxes should be integrated within the fabric of the building and should be positioned to be between south and west facing. Like the bird boxes these should be installed at least 3m high. Habibat bat boxes will be used, as shown in Figure 4.6. In addition to the typical small crevices provided by bat bricks, Habibats feature open cavities which are suitable for a number of cavity dwelling species including Myotis bats.

All bird and bat boxes should be placed out of direct sunlight and the most powerful winds, with unobstructed access and not directly above or under windows, doors or balconies. An ecologist should advise on the exact locations for these.

Figure 5.6 Habitat bat box



5.7 HEDGEHOG NEST BOXES

A hedgehog house will be placed alongside the log pile, in a sheltered, undisturbed part of the site, such as within the woodland. An example of a hedgehog house which could be used is the Eco Hedgehog Nest Box, from <https://www.nestbox.co.uk/products/eco-hedgehog-nest-box> which is long lasting constructed from recycled plastic. It includes a generous nesting chamber with integrated tunnel to stop predators or cats entering the box. Featuring a removable/replaceable wooden floor for hedgehogs to build their nest on and provides an ideal home for hedgehog hibernation and breeding.

Figure 5.7 Eco Hedgehog Nest Box, from <https://www.nestbox.co.uk/products/eco-hedgehog-nest-box>



Connectivity for species such as hedgehog should be provided through provision of 13cmx13cm gaps in fencing and walls throughout the site. Suitable ground floor landscaping should provide corridors for movement and locations for foraging for species such as hedgehog.

6.0 BIODIVERSITY NET GAIN ASSESSMENT

The incorporation of the landscaping proposals within the development (Section 5) has the potential to increase the ecological value of the site. In order to assess the change in ecological value a Biodiversity Net Gain (BNG) assessment has been undertaken.

The habitat creation that will be delivered through the proposals are set to deliver a total net increase of 25.67% in biodiversity value. The proposals are therefore in compliance with local and national planning policy, as well as the BNG mandate.

Details on how the habitat enhancement will be achieved through the ongoing management of these habitats can be found in Section 7.0 below.

The full details of the BNG assessment can be found at Appendix D and the areas of habitat are shown on the landscape plan at Appendix C.

7.0 MANAGEMENT AND MONITORING

This section provides an overview of the relevant management and monitoring features of the ecological enhancements at the site.

The management plan will follow a clearly defined 5-year timetable that will be used as a reference point for site maintenance, monitoring and any future planting and enhancement works that may be necessary.

Living roofs 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 plan will include actions to maintain the ecological objectives for the habitat strategy, which are:

- Optimise biodiversity measured by the range of wildlife benefiting plant species, lichens, mosses and fungi, and invertebrate and bird species using the landscaped areas, enhancement features and living roofs;
- Encourage invertebrates through diverse range of floral species and suitable invertebrate niche habitats;
- Encourage species highlighted in the UK, London and Haringey BAPs and Red Data Book.

7.1 FEATURES TO BE MANAGED

The following features will be created on site and therefore require management and monitoring in the long term:

- Biodiverse roof;
- Woodland planting;
- Tree planting;
- Rain garden;
- Bird, bat, hedgehog and bee boxes; and
- Stag beetle loggeries.

The management actions are summarised in Table 7.1. The table outlines the necessary responsibilities and key objectives for the next 5 years with monitoring surveys conducted in the summer, informing any management actions necessary to be undertaken in the autumn.

Table 7.1 Summary of Management Actions for First 5 Years

Year after completion and season	Habitat Management Plan
Upon project completion	• Post-Construction inspection to verify installed features match the plans; • Confirm installation and seeding of biodiverse roofs, with invertebrate features; • Confirm installation of bird, bat, hedgehog and invertebrate boxes/bricks and stag beetle loggery; • Confirm implementation of all landscape enhancements including rain gardens, woodland planting and tree planting.
Years 1-5 (Summer)	Monitoring Actions
	• Monitoring will occur annually for the first five years - the monitoring will measure the success of species survival rates on the biodiverse roofs, woodland planting and rain garden - this will inform the need for any remedial measures required to help these habitats achieve the targeted BNG conditions. Monitoring will also measure the success of habitat features through the recording of targeted species presence on site. The monitoring will be done through:
	○ A single site visit to be conducted between May and August
	○ Check bird/bat/hedgehog/bee boxes/stag beetle loggery are intact and inspect for signs of occupancy/uptake (bird and bat boxes should only be inspected by an ecologist - see management constraints below)
	○ Full botanical inventory of the biodiverse roof, rain garden and woodland planting
	Reporting
	• Annual monitoring report will be produced
	• An assessment of the effectiveness of monitoring programme will be produced
	Remedial Actions
	• As identified by annual report • Litter removal • Re-seeding/plug-planting of green roof (as required) • Removal of invasive species/unwanted species prior to them setting seed
Years 1 - 5 (Autumn/Winter)	Monitoring Actions
	• None
	Reporting Procedure

Year after completion and season	Habitat Management Plan
	Submission of all biological records obtained to Greenspace Information for Greater London (GIGL)
	Remedial Actions
	Litter removal
	Bird box maintenance and management actions undertaken
Year 5 (Winter)	- Review of five-year monitoring results against the desired outcomes of the BNG assessment and uptake of habitat features; - Determine whether changes to the frequency of monitoring should occur; and - Produce a relevant, updated 5-year monitoring plan.

7.2 ECOLOGICAL CONSTRAINTS TO MANAGEMENT

The bird boxes will provide potential to support nesting birds. To avoid disturbing, harming or killing any nesting birds or their young, any maintenance and management of these features should take place outside of the breeding bird season (the breeding season is taken to run from March-September inclusive). If this is not possible an inspection for nesting birds must take place, by a suitable qualified ecologist, prior to any works on taking place.

7.3 ECOLOGICAL MONITORING

Bird boxes

It is recommended that the bird boxes are monitored between May-August each year to check their uptake by nesting birds. This should take place as early in the morning as possible to minimise the amount of disturbance experienced during observation.

Records of any nesting birds using the boxes should be sent to GIGL.

Bat boxes

It should be assumed that bat boxes are occupied and therefore any monitoring works should be undertaken by a Natural England bat licenced ecologist. Monitoring will involve the search for droppings below the entrance of the bat boxes and the use of an endoscope to carefully examine whether bats are roosting.

7.4 TIMESCALES

The management plan will begin as soon as the woodland, rain garden and biodiverse roofs have been planted (likely to be Autumn 2023/Spring 2024) and management will be ongoing for a minimum of 30 years to ensure that the habitats are in optimal condition.

7.5 RESPONSIBILITY

Maintenance

Maintenance of all enhancement features, other than biodiverse green roofs, should be the responsibility of the owner/developer or a company appointed by the owner/developers.

Biodiverse green roof maintenance should be undertaken by the green roof supplier. This should take place annually for the lifetime of the green roof.

The Building owner/developer should keep a record of all maintenance carried out internally or by a third party.

Monitoring

A suitably qualified ecologist should be commissioned to monitor the success of the ecological features installed on site and report on any remedial actions.

The building owner/developer will keep a record of all monitoring undertaken at the site.

8.0 SUMMARY AND CONCLUSIONS

Greengage was commissioned by Formation Design and Build Ltd to produce an Ecological Management Plan, for Cranwood House, in the London Borough of Haringey, to address the aforementioned ecology related planning condition.

Targeted ecological enhancements have been specified in light of baseline conditions, contemporary best practice, local conservation targets (such as BAP priorities), relevant planning policy, and proposed development details. Enhancements have been incorporated into the landscaping proposals and will seek to create habitat suitable for supporting rare, protected and notable ecological receptors, ensuring net gains in biodiversity value.

The baseline ecological assessment determined the existing site to be comprised of buildings, hardstanding, modified grassland, introduced shrub, ruderal vegetation and broadleaved woodland. The habitats were identified as having potential to support the following protected/notable species:

- High potential to support foraging and commuting bats;
- High potential to support nesting birds; and
- Moderate potential to support hedgehogs.

Mitigation and enhancements recommended for the site include living roofs, woodland planting, wildlife friendly planting, integrated bird and bat boxes in buildings across the site, hanging bird boxes in trees, invertebrate features and on-going wildlife sensitive management.

Net gains in ecological value will be delivered in the medium to longer terms as a result of the proposed ecological enhancements and site management. Monitoring of the site for biodiversity will occur annually, incorporating ecological surveys for birds and insects, so that lessons can be learnt and shared across other sites where these enhancement features are designed.