

Brighter strategies
for greener projects



Client: Elmsbrook
Project: 35-39 Friar Street, Reading
Report: Biodiversity Assessment (BREEAM Compliant)

QUALITY ASSURANCE

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CONTENTS

1.0	EXECUTIVE SUMMARY	6
1.1	BREEAM	6
2.0	INTRODUCTION	7
2.1	SITE DESCRIPTION	7
2.2	DEVELOPMENT DESCRIPTION	7
2.3	SUITABLY QUALIFIED ECOLOGISTS (BREEAM)	7
2.4	DEFINITIONS	8
3.0	ECOLOGICAL CONTEXT	9
3.1	METHODOLOGY	9
3.2	DETAILED DESCRIPTION OF SITE	10
3.3	DISCUSSION	15
4.0	LE02 - ECOLOGICAL RISKS AND OPPORTUNITIES	16
4.1	PREREQUISITE REQUIREMENTS	16
4.2	ASSESSMENT CRITERIA	16
4.3	AWARDING OF CREDITS - LE02	17
5.0	LE03 - MANAGING NEGATIVE IMPACTS ON ECOLOGY	18
5.1	PREREQUISITE REQUIREMENTS	18
5.2	ASSESSMENT CRITERIA	18
5.3	AWARDING OF CREDITS - LE03	19
6.0	LE04 - CHANGE AND ENHANCEMENT OF ECOLOGICAL VALUE	20
6.1	PREREQUESTITE REQUIREMENTS	20
6.2	ASSESSMENT CRITERIA	20
6.3	ENHANCEMENT RECOMMENDATIONS	21
6.4	AWARDING OF CREDITS - LE04	26
7.0	LE05 - LONG TERM ECOLOGY MANAGEMENT AND MAINTENANCE	30
7.1	PREREQUISITE REQUIREMENTS	30
7.2	ASSESSMENT CRITERIA	30
7.3	AWARDING OF CREDITS - LE05	32
8.0	SUMMARY AND CONCLUSION	33
FIGURE 1 – EXISTING SITE PLAN		
APPENDIX A RELEVANT LEGISLATION AND POLICY		
APPENDIX B BIODIVERSE ROOF SPECIES MIX		

APPENDIX C RHS PLANTS FOR POLLINATORS**APPENDIX D BNG CONDITION INFORMATION****APPENDIX E LANDSCAPE AND ECOLOGY MANAGEMENT PLAN****REFERENCES****Tables**

Table 3.1 Designations

Table 4.1 Prerequisite requirements for LE02

Table 4.2 Assessment Criteria for LE02

Table 5.1 Prerequisite requirements for LE02

Table 5.2 Assessment criteria for LE03

Table 6.1 Prerequisite Requirements for LE04

Table 6.2 Assessment Criteria for LE04

Table 6.3 Credits available under different change in ecological value scenarios

Table 6.4 Post-Development is provided in table 6.4 below

Table 6.6 Change in Biodiversity Units

Table 7.1 Prerequisite requirements for LE05

Table 7.2 Assessment Criteria for LE05

Figures

Figure 3.1 Frontage of 35-38 Friar Street

Figure 3.2 Frontage of 39 Friar Street

Figure 3.3 The rear of 35-38 Friar Street

Figure 6.1 Log piles and sand piles

Figure 6.2 Sand pile with cobbles

Figure 6.3 Rope coils

Figure 6.4 Trellis green walls

Figure 6.5 Bee bricks and posts

Figure 6.8 Green and Blue Swift Block

Figure 6.10 Example open fronted box

1.0 EXECUTIVE SUMMARY

Greengage Environmental Ltd was commissioned to undertake a Biodiversity Assessment (BREEAM Compliant) by Elmsbrook for the Friar Street development in Reading.

The site survey and assessment aimed to establish the ecological value of this site and the presence/likely-absence of notable and/or legally protected species in order to inform appropriate mitigation, compensation and enhancement actions in light of proposed development works.

Further to the above, the site survey information has also been used to assess the number of available credits under the Land Use and Ecology (LE02-LE05) heading of the *BREEAM New Construction 2018* scheme.

The proposals seek a residential led mixed use scheme with associated car parking.

The site comprises a series of flat roofed brick commercial buildings with associated hardstanding.

The site walkover survey, undertaken on 2nd February 2022, confirmed that the site has **Negligible** potential to support protected/notable species.

Should the recommended ecological enhancements be incorporated then the development proposals will ensure a net gain in biodiversity is delivered on site in accordance with national and local policy, and emerging legislative requirements.

1.1 BREEAM

Within *BREEAM New Construction 2018* there are 4 headings (LE02 - LE05) relating to the provision of 11 available credits for Land Use and Ecology. This report provides the information and background to the credits that are deemed suitable to be awarded.

A summary of those credits recommended to be awarded at this stage under *BREEAM New Construction 2018* are as follows:

- Two credits under LE02;
- Three credits under LE03;
- Four/five credits under LE04; and
- Two credits under LE05.

The calculations undertaken under the requirements of LE04 demonstrate that the proposals have potential to lead to an 200% biodiversity net gain score associated with area-based habitats.

To allow the credits to be awarded, a Suitably Qualified Ecologist should return to the site on practical completion to confirm that all enhancement recommendations have been incorporated.

2.0 INTRODUCTION

Greengage Environmental Ltd was commissioned to undertake a Biodiversity Assessment (BREEAM Compliant) by Elmsbrook for the 35-39 Friar Street development in the Reading.

The site survey and assessment aimed to establish the ecological value of this site and the presence/likely-absence of notable and/or legally protected species in order to inform appropriate mitigation, compensation and enhancement actions in light of proposed development works.

Further to the above, the site survey information has also been used to assess the number of available credits under the Land Use and Ecology (LE02-LE05) heading of the *BREEAM New Construction 2018* scheme.

2.1 SITE DESCRIPTION

The survey area extends to approximately 0.14 hectares and is centred on National Grid Reference SU713736, OS Co-ordinates 471380, 173605.

The site is situated in a highly urban context between the railway station to the north and the main shopping district, Broad Street and the Oracle, to the south. The site is comprised of a number of plots on Friar Street which includes numbers 35-38 (Cosmo) and number 29 (9 Round). All buildings are of brick construction with flat roofs. Friar Street runs east-west connecting the Inner Distribution Road in the west to Reading Town Hall and Museum to the east. Friar Street is made up of predominately retail use at ground floor with office and residential spaces above. Building heights vary between 3 and 6 storeys with the exception of the Novotel, which rises to 13 storeys. To the eastern edge of the site is Merchants Place, which links Garrard Street to the north, set around 5m below Friar Street.

2.2 DEVELOPMENT DESCRIPTION

The proposals seek a residential led mixed use scheme with associated car parking.

2.3 SUITABLY QUALIFIED ECOLOGISTS (BREEAM)

A requirement for projects using BREEAM Assessment Route 2 is that a 'Suitably Qualified Ecologist' (SQE) advises the project team on a number of issues. Greengage provides SQEs, specifically:

- Mitch Cooke, who reviewed this report, has a degree in Ecology (Hons), an MSc in Environmental Assessment and Management, and is a Full member of CIEEM with over 35 years' experience in ecological survey and assessment. Mitch has set up and developed ecological and environmental teams for nearly 20 years and has undertaken and managed numerous ecological surveys and assessments. He is the Director at Greengage and manages the team.
- James Bumphrey, who completed the site survey and wrote this report, has an undergraduate degree in Environmental Sciences (BSc Hons), a Master's degree in Environmental Consultancy and a Natural England Great Crested Newt Licence (2018-35160-CLS-CLS). James has over 8 years' experience in ecological consultancy.

Mitch Cooke 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.

Under the BREEAM definition, all of the individuals above are considered SQEs.

2.4 DEFINITIONS

Zone of Influence

The BREEAM definition of zone of influence refers to areas of land or water bodies impacted by the site undergoing assessment. These areas can be adjacent to the site or can be areas that are dependent on the site but not physically linked, including areas downstream from a site. Areas within the zone of influence can be negatively affected by changes on an assessment site but they also provide further opportunity to maximise enhancement activities.

3.0 ECOLOGICAL CONTEXT

3.1 METHODOLOGY

The Preliminary Ecological Appraisal (which included an Extended Ecological Phase 1 Survey) was undertaken in accordance with guidance in the Joint Nature Conservation Committee (JNCC) (2010) Handbook for Phase 1 Habitat Survey and the Chartered Institute of Ecological and Environmental Management (CIEEM) (2017) Guidelines for Preliminary Ecological Appraisal, in accordance with BS42020:2013: Biodiversity. The overall assessment consisted of:

- Site specific biological information gained from statutory and non-statutory consultation; and
- A site walkover, protected species scoping assessment and phase 1 habitat survey.

The site-specific consultation provided the ecological context for the site survey carried out on the 2nd February 2022.

The survey boundary and existing site is shown at Figure 1.

Greengage undertook the site walkover in cold and overcast 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, and supplemented with target notes on areas or species requiring further commentary. 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.

See Appendix A for legislation and policy context.

Desk Top Review

A review of readily available ecological information and other relevant environmental databases (including Defra's Multi-Agency Geographic Information for the Countryside (MAGIC) website) was undertaken for the site and its vicinity. In addition, a biological records search from Thames Valley Environmental Records Centre (TVERC) was reviewed to identify the location and citations of local non-statutory designated sites and presence of records for notable and protected species. This provided the overall ecological context for the site, to better inform the survey.

On Site Surveys

Flora

The extent and distribution of different habitats on site were identified and mapped according to the standard Phase 1 Survey methodologies, supplemented with target notes describing the dominant botanical species and any features of interest (where relevant). Any present protected plant species and invasive/non-natives were also noted. The existing site is shown on Figure 1.

Fauna

The Phase 1 Survey specifically included assessments to identify the potential value for notable, rare and protected species at site. This involved identifying potential habitats in terms of refugia, breeding sites and foraging areas in the context of species known to be present locally and regionally.

The likelihood of occurrence is ranked as follows:

- 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.

The information recorded during the survey has been used to provide an assessment of the ecological baseline value of the application site in the context of this report.

Constraints

The site survey was entirely external. All buildings on site are flat roofed (no internal roof void space) therefore an internal inspection for bats was not deemed necessary.

3.2 DETAILED DESCRIPTION OF SITE

Desk Study

Designated Sites

Consultations with the local biological record centre (TVERC) and the MAGIC dataset have confirmed that there are no statutory designations of national or international importance within the boundary of the site or within 1 km radius. There were also no non-statutory designations on site although there were 3 Local Wildlife Sites within a 1 km radius. LWSs are recognised by Local Planning Authorities (LPAs) as important wildlife sites.

Table 3.1 below gives the locations and descriptions of the LWS.

Table 3.1 Designations

Name of Site	Distance	Description
Cow Lane Depot LWS	0.7km northwest	A small isolated, triangular site bounded by a railway track, situated towards the centre of Reading. The site forms a mosaic of habitats ranging from willow scrub with mature trees, to open standing water with swamp to ruderal and tall herb grassland. The site has a varied topography with a steep north facing slope colonized by buddleia, hazel and goat willow. Cow Lane Depot provides a wildlife corridor in an urban landscape.
Holy Brook LWS	0.8km south	This site was originally designated as a number of separate sites which have now been combined. These were the stretch south of Berkley Avenue and the stretch between Berkley Avenue and the Reading Inner Distribution Road. The Holy Brook is a stream that carries water from and emptying back into the River Kennet, a chalk river. The western end of the site lies just west of the Burghfield Road although the brook originates further west near Theale. The central section it flows through the Fobney and River Kennet Meadows. To the east its course it adjacent to housing and through commercial and industrial areas.
River Kennet/Kennet and Avon Canal LWS	0.9km south	This stretch of the River Kennet and the Kennet and Avon Canal runs from Southcote Lock, south-east of Reading, to Waterloo Meadows (adjacent to Edgar Road), near the centre of Reading. The River Kennet has a whole contains sections of high-quality chalk river. The Kennet & Avon Canal section is also fed by water from the River Kennet and is calcareous in nature. The river has a towpath running along most of its length and is well-used by walkers and cyclists.

Species Records

The information provided in the biological data search from TVERC identified records of a number of protected and BAP priority species within 1km search radius of the site. Among others, these include the following species of relevance:

- Birds - peregrine falcon (*Falco peregrinus*), house sparrow (*Passer domesticus*), black redstart (*Phoenicurus ochruros*), swift (*Apus apus*) and starling (*Sturnus vulgaris*).

- Bats - noctule (*Nyctalus* sp.), Daubenton's (*Myotis daubentonii*), serotine (*Eptesicus serotinus*), common pipistrelle (*Pipistrellus pipistrellus*) and soprano pipistrelle (*Pipistrellus pygmaeus*).

The species listed above are primarily those known to be in the area that may be impacted by any proposals at the site, or that stand to benefit as a consequence of potential ecological enhancements at the site and inform site-specific mitigation and enhancement recommendations described in the following chapter.

Biodiversity Action Plans

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 LBAP of most relevance to the site are set out below.

Reading BAP

The plan aims to ensure that by 2030 Reading will be richer in wildlife, be better connected to the wider landscape and that biodiversity loss will have been reversed. Notable target species include:

- Bats;
- Swift;
- House sparrow; and
- Black redstart.

Site Visit

Habitats

The only habitat recorded on site during the ecological site walkover, as classified by The Joint Nature Conservation Committee (JNCC), was buildings and hardstanding.

The site comprises a series of flat roofed brick commercial buildings with associated hardstanding. The facades of the buildings are a mixture of brick and glazing. The site is split into two parts:

- Numbers 35-38 (Cosmo); and
- Number 39 (9 Round).

There is no vegetation on the site.

Site photos are provided below with the existing site shown on Figure 1.

Figure 3.1 Frontage of 35-38 Friar Street



Figure 3.2 Frontage of 39 Friar Street



Figure 3.3 The rear of 35-38 Friar Street



Protected and Notable Species Potential

Bats

The buildings flat roofs and brick exteriors were lacking in any obvious potential roosting features. Further to this, given the sites highly urbanised location, position adjacent to an active construction site and isolation from foraging habitats, the potential was considered **Negligible**.

Nesting Birds

The building was also assessed for bird nesting. The roofs were considered unsuitable, with no evidence of nesting observed. A pigeon was noted loafing on the roof of 35-38 Friar Street, although no evidence of nesting or access to the building for this species was recorded. The nesting potential across the site was therefore **Negligible**.

Additional Species

There was also no direct evidence or field signs for any further protected species, it is considered the potential for the site to support the following species is **Negligible**:

- Badger;
- Great Crested Newt;
- Foraging Bats;
- Reptiles;
- Dormouse;
- Water Vole;
- Otter;
- Invertebrates; and
- Other Biodiversity Action Plan Species.

3.3 DISCUSSION

The survey confirmed the site as being of low ecological value with limited coverage of semi-natural habitats. There are no ecological receptors of note, such as records for protected species or designated sites within the likely zone of impact of the scheme, and the site has **Negligible** potential to support the majority of notable and/or protected habitats and/or species.

Should the recommended ecological enhancements be incorporated then the development proposals will ensure a net gain in biodiversity is delivered on site in accordance with national and local policy, and emerging legislative requirements.

The following sections of the report detail the achievable Land Use and Ecology credits under *BREEAM New Construction* 2018 (LE02-LE05) in light of the above survey findings.

4.0 LEO2 - ECOLOGICAL RISKS AND OPPORTUNITIES

4.1 PREREQUISITE REQUIREMENTS

Table 4.1 Prerequisite requirements for LEO2

Criteria No.	Criteria	Comments	Met
1	The client or contractor confirms compliance is monitored against all relevant UK and EU or international legislation relating to the ecology of the site	An overview of UK and EU legislation relating to ecology and biodiversity conservation is provided in Appendix A.	Y

4.2 ASSESSMENT CRITERIA

Table 4.2 below outlines assessment criteria and provides commentary on how/if the proposals meet the criteria. Criterion 2 for LEO2 is only applicable to Assessment Route 1 and is not considered:

Table 4.2 Assessment Criteria for LEO2

Criteria No.	Criteria	Comments	Met
3	A Suitably Qualified Ecologist (SQE) carries out a survey and evaluation for the site early enough to influence site preparation works, layout and, where necessary, strategic planning decisions	Greengage were appointed as ecologists at RIBA stage 1 to provide ecological advice.	Y
4	The SQE's survey and evaluation determines the site's ecological baseline, including: 4.a: Current and potential ecological value and condition of the site and related areas within the Zone of Influence. 4.b: Direct and indirect risks to current ecological value from the project. 4.c: Capacity and feasibility for enhancement of the site's ecological value and, where relevant, areas within the Zone of Influence.	This report includes the findings of an ecology site walkover undertaken on 2nd February 2022 providing baseline ecological data for the site and zone of influence. Enhancement measures in the form of wildlife friendly planting, bird/insect boxes and living roofs features have been recommended (See LEO4).	Y

Criteria No.	Criteria	Comments	Met
6	Recommendations and data collected from the survey and evaluation are shared with appropriate project team members to influence decisions made for activities during site preparation, design and construction works, which can support ecological features	Greengage have liaised with the client project team and used knowledge of local ecology and desired conservation targets for Reading.	Y
7	The project team liaise and collaborate with representative stakeholders (see Methodology) early enough to influence key planning decisions to: 7.a: Identify the optimal ecological outcomes for the site. 7.b: Identify, appraise and select measures to meet the optimal ecological outcomes for the site (criterion 7.a), in line with the mitigation hierarchy of action, according to the route being used	Stakeholders (as per BREEAM) definition include the client, project team and local government and other statutory relevant organisations, local community groups or organisations or charities. Consultation with MAGIC and TVERC was undertaken to determine ecological risks and define zone of impact. This is the only relevant stakeholder engagement for the project.	Y

4.3 AWARDING OF CREDITS - LE02

Meeting all the criteria in tables 4.1 and 4.2 allows the awarding of **two credits** for LE02 – Ecological Risks and Opportunities. The project meets all these criteria.

5.0 LE03 - MANAGING NEGATIVE IMPACTS ON ECOLOGY

5.1 PREREQUISITE REQUIREMENTS

Table 5.1 Prerequisite requirements for LE02

Criteria No.	Criteria	Comments	Met
1	LE02 has been achieved	See above	Y

5.2 ASSESSMENT CRITERIA

Table 5.2 below outlines assessment criteria applicable to Assessment Route 2 and provides commentary on how proposals meet the criteria. Criteria 5 and 6 for LE03 are only applicable to Assessment Route 1 and is not considered:

Table 5.2 Assessment criteria for LE03

Criteria No.	Criteria	Comments	Met
2	Further planning to avoid and manage negative ecological impacts on-site is carried out (see Methodology) early enough to influence the concept design and design brief as well as site preparation planning	In light of the findings of the ecological site visit, there no foreseeable negative ecological impacts, therefore further planning not required. There is no need to undertake any further survey work.	Y
3	On-site measures for managing negative ecological impacts during site preparation and construction are implemented in-practice	In light of the findings of the ecological site visit, there no foreseeable negative ecological impacts, therefore further measures not required.	Y
4	Criteria 2-3 are based on input from the project team in collaboration with representative stakeholders and data collated as part of the 'Determining ecological outcomes' in LE 02	All ecological recommendations made in this report were informed by an ecological site visit and desk-based consultation.	Y
7	Criteria 2-4 have been achieved	See above.	Y

Criteria No.	Criteria	Comments	Met
8a.	Negative impacts from site preparation and construction works have been managed according to the hierarchy for managing negative impacts on site	No negative impacts anticipated and this criterion should therefore be met.	Y
8b.	No overall loss of ecological value has occurred	See full calculation in LE04 section.	Y

5.3 AWARDING OF CREDITS - LE03

The proposals meet criteria 2, 3 and 4 therefore the first credit under LE03 is available.

The proposals also meet criteria 8b and are therefore eligible for a further 2 credits. As such, a total of **three credits** are to be awarded for LE03 – Managing Negative Impacts on Ecology.

6.0 LE04 - CHANGE AND ENHANCEMENT OF ECOLOGICAL VALUE

6.1 PREREQUESTITE REQUIREMENTS

Table 6.1 Prerequisite Requirements for LE04

Criteria No.	Criteria	Comments	Met
1	Criteria 2-3 in LE03 have been achieved	See above	Y
2	The client or contractor confirms compliance is monitored against all relevant UK, EU or international legislation relating to the ecology of the site	All legislation of potential relevance listed in Appendix A.	Y

6.2 ASSESSMENT CRITERIA

Table 6.2 below outlines assessment criteria applicable to Assessment Route 2 and provides commentary on how proposals meet the criteria. Criteria 3 is only applicable for Assessment Route 1 and is therefore not considered:

Table 6.2 Assessment Criteria for LE04

Criteria No.	Criteria	Comments	Met
4	Measures have been implemented that enhance ecological value, which are based on input from the project team and SQE in collaboration with representative stakeholders and data collated as part of the 'Determining ecological outcomes' in LE 02. Measures are implemented in the following order: a. On site, and where not feasible; b. Off site within the zone of influence	Ecological enhancements identified using data gathered from ecology site walkover and desk-based assessment are specified in this report. These deliver enhancement of the site itself, in addition to the zone of influence.	Y

Criteria No.	Criteria	Comments	Met
5	Data collated are analysed and where potentially valuable, provided to the local environmental records centres nearest to, or relevant for, the site.	No records of note were identified during the site visit. Any findings recorded during monitoring programme will be submitted to TVERC.	Y
6	Up to three credits are awarded based on the change in ecological value occurring as a result of the project. This must be calculated in accordance with the process set out in GN36 - BREEAM, CEEQUAL and HQM Ecology Calculation Methodology – Route 2. Credits are awarded in line with the Reward Scale table in GN36 where there are no residual impacts on protected sites or irreplaceable habitats	See below.	Y

6.3 ENHANCEMENT RECOMMENDATIONS

Specific ecological enhancement recommendations are set out below.

Biodiverse Living Roofs

Biodiverse living roofs will be incorporated and in some sections will be combined with PV. Further details can be secured by condition and will be dependent upon the contractor selected however, the roof will follow the principles below:

- The roof should be substrate based biodiverse system planted with plugs and seeded with suitable species (see Appendix B);
- Seeds should 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;
- Substrate should largely be a 'typical' biodiverse substrate designed for extensive living roofs, composed of recycled crushed brick, expanded clay shale and recycled organic content. Where room is available additional substrates should be considered:
 - A sandy/ finer gravel substrate; and

- Pebbles/Caledonia cobbles of roughly 40-120mm size mixed with the biodiverse roof substrate.
- Where suitable (e.g away from areas of PV) 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; and
- Invertebrate habitat structure - Log piles, sandy piles, stone swirls, ephemeral water features (if room available):
 - For log piles, wood from broadleaved trees such as oak and beech, and from fruiting trees such as apple and pear where possible should be used, at least 100mm in diameter with the bark still on. Logs in contact with the substrate will remain damp underneath, which is vital for many invertebrates such as woodlice. Logs should be placed both vertically and horizontally in clusters; vertical standing wood should be incorporated by submerging the logs into the full depth of the substrate, ideally in the deeper sections, again using a range of diameters and lengths. A minimum of two log piles per 100m² of roof.
 - Sandy piles should 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. A minimum of four sandy piles incorporated per 100m² of roof.
 - Rope made from natural fibres should 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 should be coiled in a spiral shape to cover an area of 1m²; the rope should 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. A minimum of two rope coils incorporated per 100m² of roof.

Figure 6.1 Log piles and sand piles



Figure 6.2 Sand pile with cobbles



Figure 6.3 Rope coils



Wildlife Friendly Landscaping

Shrub and Herbaceous Planting

To maximise the benefit of the proposed areas of shrub and herbaceous planting for wildlife, species listed on the RHS Good for Pollinators Guide (Appendix C) should; be favoured where possible.

This list includes a selection of species which flower in spring, summer and winter meaning there would be constant nectar resource on site throughout the year.

Example species selected for indicative landscaping plan are provided below:

- Viburnum sp.
- Fatsia japonica
- Anemone sp.
- Digitalis sp.
- Helleborus sp.
- Snowberry

Trellis Green Walls

Where possible, green walls consisting of climbing plants supported by wire trellis systems should be installed where suitable. Species could include:

- Ivy (*Hedera helix*);
- Hops (*Humulus lupulus*);
- Travellers joy (*Clematis vitalba*);
- Star jasmine (*Trachelospermum jasminoides*) and
- honeysuckle (*Lonicera periclymenum*).

These plant species would increase biodiversity on-site, providing mixed height vegetation with foliage providing effective nesting habitat for a variety of birds, and the flowers attracting a range of invertebrates.

These trellises can be installed on boundary walls/fences, or along the walls of the new building. For the purposes of the change in ecological value calculation it has been assumed that 5m length of vertical greening can be provided.

Figure 6.4 Trellis green walls



Invertebrate Features

Bee bricks or posts could be located amongst areas of planting at the terrace or ground floor level. These features need to be close to the shrub and herbaceous planting in order to provide a constant nectar resource for pollinators on a year-round basis.

Bee posts can be bought off the shelf as products, or simply made, and bee bricks are readily available for purchase.

These posts/bricks provide excellent nesting habitat for invertebrate species, most notably solitary bee species.

Figure 6.5 Bee bricks and posts



Bird Boxes

Swift Boxes

Swift nest bricks, hollow blocks sized to hold a nest, are an excellent way to provide swifts with nesting opportunities. They should be fitted either on a side of the building that gets some shade during the day, or under an overhang or under the eaves, to give protection from heat, but not over windows or near to vents. They should be sited at least 5 metres above ground, with clear adjacent airspace so the swifts can access them in high-speed direct flight.

Figure 6.8 Green and Blue Swift Block



Generalist Bird Boxes

Generalist boxes could be provided at roof level to provide nesting opportunities for black redstart in accordance with the Reading BAP.

Figure 6.10 Example open fronted box



6.4 AWARDING OF CREDITS - LE04

The first LE04 credit can be awarded by providing data obtained through surveys undertaken to the relevant Local Environmental Records Centre (LERC) and upon confirmation of the inclusion of the aforementioned ecological enhancements. Greengage annually submit all biological records obtained to relevant LERCs.

The number of further credits available for LE04 scales with the percentage change in ecological value of either area-based habitats or linear habitats post-development (the lowest percentage change

between area/linear is used to inform credit achievement). In addition, requirements relating to percentage of development footprint subject to habitat creation must be met.

Table 6.3 Credits available under different change in ecological value scenarios

Reward Level	Percentage Change	Additional Requirements	Credits Awarded
Minimising loss	75-94%	An SQE must confirm that it is not practically feasible to achieve 'No net loss' requirements There are no residual impacts on protected sites or irreplaceable habitats	1
No net loss	95-104%	If there is no impact on area or linear habitats at all, then the total area of habitat created should cover at least 2.5% of the development footprint and a length of linear habitat should be created; and There are no residual impacts on protected sites or irreplaceable habitats	2
Net gain	105-109%	If there is no impact on area or linear habitats at all, then the total area of habitat created should cover at least 5% of the development footprint and a length of linear habitat should be created; and There are no residual impacts on protected sites or irreplaceable habitats	3

Reward Level	Percentage Change	Additional Requirements	Credits Awarded
Significant net gain	>110%	There are no residual impacts on protected sites or irreplaceable habitats	4 (+1 exemplary)

Calculations of the change in ecological value of the site are given below. For the purpose of the below calculations, the following drawings have been used:

- Proposed roof, hard and soft landscaping area drawing (ref: 0083-A-06-LRF-200).

The pre-development habitat areas were obtained during the ecological site visit.

Using the information provided, the approximate pre-development, baseline, biodiversity units have been calculated as 0.

Based on masterplan drawings, the post-development is predicted to provide 0.42 biodiversity units, accounting for the habitats created (extensive green roof and intensive green roof).

A breakdown of this calculation is provided in Table 6.4 below:

Table 6.4 Post-Development is provided in table 6.4 below

Proposed habitat	Area (ha)	Distinctiveness	Condition	Biodiversity Units
Urban - extensive green roof	0.0553	Medium	Good	0.37
Urban - intensive green roof	0.0267	Low	Poor	0.05
			Total	0.42

Table 6.6 Change in Biodiversity Units

	Area based biodiversity units
Pre-development	0
Post-development	0.42
% Change	200% (in accordance with guidance note KBCN1407 and guidance relating to Defra Metric)

It should be noted that the change in biodiversity value was calculated using the Defra Metric 2.0 calculator tool in accordance with BRE Guidance Note KBCN1407.

At this stage, the proposals are likely to be eligible for **four credits** under LE04, **in addition to one additional exemplary performance credit**.

7.0 LE05 - LONG TERM ECOLOGY MANAGEMENT AND MAINTENANCE

7.1 PREREQUISITE REQUIREMENTS

Table 7.1 Prerequisite requirements for LE05

Criteria No.	Criteria	Comments	Met
1	The client or contractor confirms compliance is monitored against all relevant UK and EU or international legislation relating to the ecology of the site	An overview of UK and EU legislation relating to ecology and biodiversity conservation is provided in Appendix A.	Y
2	Criterion 8 in LE 03 has been achieved, and at least one credit under LE 04 for 'Change and Enhancement of Ecology' has been awarded.	See above	Y

7.2 ASSESSMENT CRITERIA

Table 7.2 outlines the assessment criteria for LE05, and provides commentary on how the proposals meet the criteria:

Table 7.2 Assessment Criteria for LE05

Criteria No.	Criteria	Comments	Met
3	Measures have been implemented to manage and maintain ecology throughout the project. These measures are based on input from the project team in collaboration with representative stakeholders and data collated as part of the 'Determining ecological outcomes' in LE 02.	Post-construction review to be undertaken by a SQE to ensure the recommendations required for credit achievement are met. In addition, the Landscape and Ecology Management Plan (LEMP) has been provided for the enhancement features.	Y

Criteria No.	Criteria	Comments	Met
	To ensure the optimal ecological outcomes agreed in LE 02 are met in-practice, these measures must monitor and review the effectiveness of the mitigation and enhancement measures in place for LE 03 & LE 04 to ensure they are implemented		
4	A Landscape and Ecology Management Plan (LEMP), or equivalent, has been developed in accordance with BS 42020:2013 Section 11.11 covering at least the first five years after project completion as a minimum and including: 4.a: Actions and responsibilities of relevant individuals prior to handover 4.b: The ecological value and condition of the site at handover and how this is expected to develop and change over time 4.c: Identification of opportunities for ongoing alignment with activities beyond the development project, which support the aims of BREEAM's Strategic Ecology Framework 4.d: Identification and guidance to trigger appropriate remedial actions to address previously unforeseen impacts 4.e: Clearly defined and allocated roles and responsibilities for delivering the plan	LEMP provided within Appendix E which addresses 4a to 4e.	Y

Criteria No.	Criteria	Comments	Met
5	A section on Ecology and Biodiversity has been included as part of the tenant or building owner information supplied, to inform the owner or occupant of local ecological features, value and biodiversity on or near the site. This should include detailed management and maintenance plans as required by landscape and asset managers as well as relevant parts of the handover information for occupiers written in a format that encourages understanding and supportive behaviours	The LEMP produced will be isolated as a separate document to be handed to estates/facilities management	Y
6	The landscape and management plan or similar will be updated to support maintenance of the ecological value of the site	The LEMP, in line with BS42020 2013 will feature a feedback mechanism to ensure that it is updated in light of site conditions	Y

7.3 AWARDING OF CREDITS - LE05

By adhering to the requirements described in Table 7.2 and the management plan provided in Appendix E, the proposals are eligible for two credits under LE05.

8.0 SUMMARY AND CONCLUSION

Greengage Environmental Ltd was commissioned to undertake a Biodiversity Assessment (BREEAM Compliant) by Elmsbrook for the Friar Street development in Reading.

An ecological site walkover survey was undertaken on 2nd February 2022. The survey confirmed the site as being of low ecological value with limited coverage of semi-natural habitats. There are no ecological receptors of note, such as records for protected species or designated sites within the likely zone of impact of the scheme, and the site has negligible potential to support notable and/or protected habitats and/or species.

Selected ecological enhancements are recommended for BREEAM LE04, including the provision of wildlife-friendly landscaping, a biodiverse living roof, vertical greening, bird boxes and invertebrate habitat features.

BREEAM

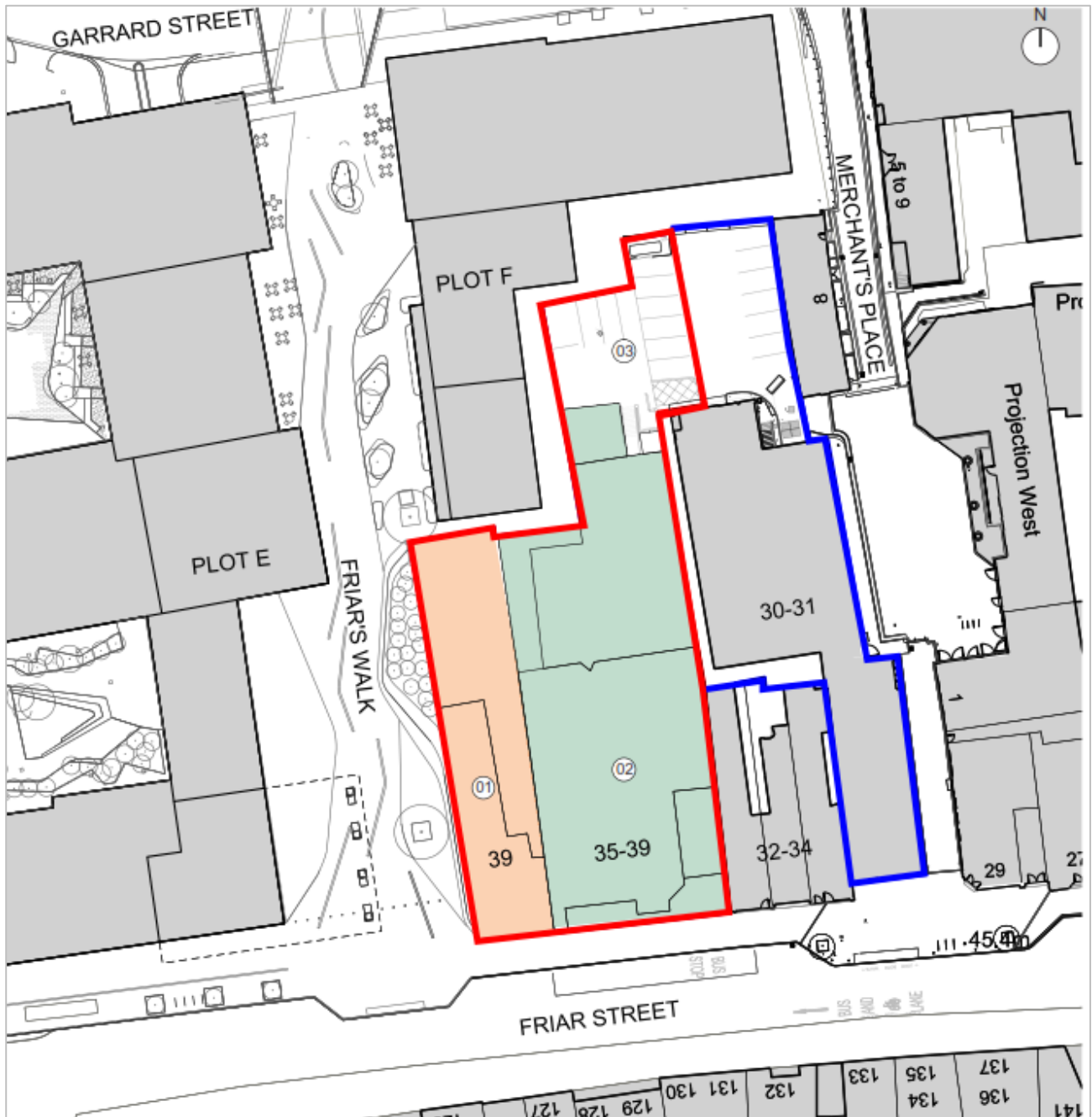
The proposals are likely to obtain the following *BREEAM New Construction 2018* credits, provided the requirements discussed in the previous chapters are met:

- Two credits for LE02 – Ecological Risks and Opportunities for the Project;
- Three credits for LE03 – Managing Impacts on Ecology;
- Four/five credits for LE04 – Change and Enhancement of Ecological Value; and
- Two credits for LE05 – Long Term Ecology Management and Maintenance.

The calculations undertaken under the requirements of LE04 demonstrate that the proposals have potential to lead to an 200% biodiversity net gain score associated with area-based habitats. This equated to a total net increase of 0.42 units.

An SQE is to conduct a Post Construction Review to ensure compliance with the specifications required for BREEAM credit achievement.

FIGURE 1 – EXISTING SITE PLAN



APPENDIX A RELEVANT LEGISLATION AND POLICY

LEGISLATION

Current key legislation relating to ecology includes the Wildlife and Countryside Act 1981 (as amended); The Conservation of Habitats and Species Regulations 2017 ('Habitats & Species Regulations'), The Countryside and Rights of Way Act 2000 (CRoW Act), and The Natural Environment and Rural Communities Act, 2006.

The Wildlife and Countryside Act 1981 (as amended) is the principal mechanism for the legislative protection of wildlife in Great Britain. This legislation is the means by which the Convention on the Conservation of European Wildlife and Natural Habitats (the 'Bern Convention') and the Birds Directive and EU Habitats Directive are implemented in Great Britain.

All nesting birds, with certain exceptions, are protected from intentional killing, destruction of nests and destruction/taking of eggs under the Wildlife and Countryside Act 1981 (as amended) and the CRoW Act. Any clearance of dense vegetation should therefore be undertaken outside of the nesting bird season, taken to run conservatively from March to August (inclusive), unless an ecologist confirms the absence of active nests prior to clearance.

ENVIRONMENT ACT 2021

The Environment Act, 2021 will mandate the requirement for new development in England to deliver a minimum 10% biodiversity net gain (BNG), as measured by the agreed metric (the current relevant version being the Defra metric 3.0), secured through planning condition as standard (as per schedule 14 of the Act). Approach to the delivery of BNG must follow the mitigation hierarchy, with avoidance of impact and on-site compensation/gains prioritised, ahead of the use of offsite biodiversity unit offsets, or the purchase of biodiversity credits. Whilst the Environment Act 2021 received Royal Assent in November 2021, secondary legislation will be required before the 10% net gain requirement is mandated.

The Act will introduce the condition that no development may begin unless a biodiversity net gain plan has been submitted and approved by the local planning authority (LPA).

The Act will also amend requirements of the NERC Act, 2006, adding the need to not just conserve, but enhance biodiversity through planning projects. Furthermore, it will introduce the need for the LPA to have regard to relevant local nature recovery strategies and relevant species/protected site conservation strategies, when making their decision.

PLANNING POLICY

National Planning Policy Framework (NPPF)

Guidance on nature conservation within planning is issued by the Government within the National Planning Policy Framework. This Framework document acts as guidance for local planning authorities

on the content of their Local Plans, but is also a material consideration in determining planning applications.

Within the NPPF the Government's vision for conserving and enhancing biological diversity in England within the planning system is set out. The Government's objectives for planning from an ecological perspective are, among others, to recognise the wider benefits of ecosystem services, minimise the impacts on biodiversity and provide net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity, which will include the establishment of coherent ecological networks that are more resilient to current and future pressures.

As a result of the NPPF any species or habitats of principal importance found on the application site, in addition to statutorily protected species, are of material consideration in the planning process.

Reading Local Plan

EN12 Biodiversity and the Green Network

On all sites, development should not result in a net loss of biodiversity and geodiversity, and should provide a net gain for biodiversity wherever possible. Development should:

- Protect and wherever possible enhance features of biodiversity interest on and adjacent to the application site, incorporating and integrating them into development proposals wherever practicable; and
- Provide new tree planting, wildlife friendly landscaping and ecological enhancements (such as wildlife ponds, bird and bat boxes) wherever practicable.

APPENDIX B BIODIVERSE ROOF SPECIES MIX

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</i> spp
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>
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>

Common name	Scientific name
South American vervain	Verbena bonariensis
Great mullein	Verbascum thapsus
Yarrow	Achillea spp.
Lesser calamint	Calamintha nepeta
Common primrose	Primula vulgaris
Mother-of-Thyme	Thymus polytrichus
Small scabious	Scabiosa columbaria
Bugle	Ajuga reptans
Biting stonecrop	Sedum acre
Mexican fleabane	Erigeron karvinskianus
Maiden pink	Dianthus deltoides
Rock rose	Cistus x purpureus
Sticky catchfly	Silene viscaria
Common wallflower	Erysimum cheiri

APPENDIX C RHS PLANTS FOR POLLINATORS

Get your garden buzzing

- ◆ Fill gardens with **RHS Plants for Pollinators** plants
- ◆ Grow **a range of plants** for year-round flowering
- ◆ **Avoid** plants with double or multi-petalled flowers
- ◆ **Never use pesticides** on plants in flower
- ◆ Provide nest sites for **wild bees**

Subspecies and cultivars of plants listed here are also **Plants for Pollinators**, except for those that provide significantly reduced floral resources (i.e. pollen and nectar). This includes most doubles. See p.2 for **key to codes**.

Winter

Nov – Feb

<i>Clematis cirrhosa</i> Spanish traveller's joy	C
<i>Crocus species</i> crocus (winter-flowering)	B
<i>Eranthis hyemalis</i> winter aconite	B
× <i>Fatshedera lizei</i> tree ivy	S
<i>Galanthus nivalis</i> common snowdrop	B
<i>Helleborus species and hybrids</i> hellebore (winter-flowering)	H
<i>Lonicera × purpusii</i> Purpus honeysuckle	S
<i>Mahonia species</i> Oregon grape	S
<i>Salix aegyptiaca</i> musk willow	S
<i>Sarcococca confusa</i> sweet box	S

Photo: RHS / Carol Sheppard (bumblebee on *Salvia farinacea* 'Victoria').



<i>Sarcococca hookeriana</i> sweet box	S
<i>Viburnum tinus</i> laurustinus	S

Spring

Mar – May

<i>Acer campestre</i> Native plant; field maple	S or T
<i>Acer platanoides</i> Norway maple	T
<i>Acer pseudoplatanus</i> sycamore	T
<i>Acer saccharum</i> sugar maple	T
<i>Aesculus hippocastanum</i> horse chestnut	T
<i>Ajuga reptans</i> Native plant; bugle	H
<i>Arabis alpina</i> subsp. <i>caucasica</i> alpine rock cress	H
<i>Armeria juniperifolia</i> juniper-leaved thrift	H
<i>Aubrieta species</i> aubretia	H
<i>Aurinia saxatilis</i> gold dust	H
<i>Berberis darwinii</i> Darwin's barberry	S
<i>Berberis thunbergii</i> Japanese barberry	S
<i>Bergenia species</i> elephant ear	H
<i>Buxus sempervirens</i> Native plant; common box	S
<i>Caltha palustris</i> Native plant; marsh marigold	H
<i>Ceanothus species</i> California lilac	S
<i>Cercis siliquastrum</i> Judas tree	T
<i>Chaenomeles species</i> Japanese quince	S
<i>Cornus mas</i> Cornelian cherry	S
<i>Cotoneaster conspicuus</i> Tibetan cotoneaster	S
<i>Crataegus monogyna</i> Native plant; common hawthorn	S or T
<i>Crocus species</i> crocus (spring-flowering)	B
<i>Doronicum × excelsum</i> leopard's bane	H
<i>Enkianthus campanulatus</i> redvein enkianthus	S
<i>Erica carnea</i> alpine heath	S
<i>Erica × darleyensis</i> Darley Dale heath	S
<i>Erysimum species</i> wallflower	Bi or H
<i>Euphorbia amygdaloides</i> Native plant; wood spurge	H
<i>Euphorbia characias</i> Mediterranean spurge	H
<i>Euphorbia cyparissias</i> cypress spurge	H
<i>Euphorbia epithymoides</i> cushion spurge	H
<i>Euphorbia × martini</i> Martin's spurge	S
<i>Euphorbia nicaeensis</i> Nice spurge	H
<i>Geranium species</i> cranesbill	H
<i>Geum rivale</i> Native plant; water avens	H
<i>Hebe species</i> hebe	S
<i>Helleborus species & hybrids</i> hellebore (spring-flowering)	H

<i>Iberis saxatilis</i> alpine candytuft	H
<i>Iberis sempervirens</i> perennial candytuft	H
<i>Ilex aquifolium</i> Native plant; common holly	T
<i>Lamium maculatum</i> spotted dead nettle	H
<i>Lunaria annua</i> honesty	Bi
<i>Mahonia species</i> Oregon grape (spring-flowering)	S
<i>Malus baccata</i> Siberian crab	T
<i>Malus domestica</i> edible apple	T
<i>Malus floribunda</i> Japanese crab	T
<i>Malus hupehensis</i> Hupeh crab	T
<i>Malus sargentii</i> Sargent's crab apple	T
<i>Mespilus germanica</i> common medlar	T
<i>Muscari armeniacum</i> Armenian grape hyacinth	B
<i>Nectaroscordum species</i> honey garlic	B
<i>Ornithogalum umbellatum</i> common star of Bethlehem	B
<i>Pieris formosa</i> lily-of-the-valley bush	S
<i>Pieris japonica</i> lily-of-the-valley bush	S
<i>Primula veris</i> common cowslip	H
<i>Primula vulgaris</i> Native plant; primrose	H
<i>Prunus avium</i> Native plant; wild & edible cherries	T
<i>Prunus domestica</i> wild & edible plums	T
<i>Prunus dulcis</i> almond	T
<i>Prunus incisa</i> 'Kojo-no-mai' cherry 'Kojo-no-mai'	S
<i>Prunus insititia</i> damson	T
<i>Prunus laurocerasus</i> cherry laurel	S
<i>Prunus mume</i> Japanese apricot	T
<i>Prunus padus</i> Native plant; bird cherry	T
<i>Prunus pendula</i> f. <i>ascendens</i> 'Rosea' flowering cherry	T
<i>Prunus persica</i> peach	T
<i>Prunus spinosa</i> Native plant; blackthorn	S
<i>Prunus tenella</i> dwarf Russian almond	S
<i>Prunus × yedoensis</i> flowering cherry	T
<i>Pulmonaria species</i> lungwort	H
<i>Pyrus communis</i> pear	T
<i>Ribes nigrum</i> blackcurrant	S
<i>Ribes rubrum</i> Native plant; common redcurrant	S
<i>Ribes sanguineum</i> flowering currant	S
<i>Salix caprea</i> Native plant; goat willow (male form only)	S or T
<i>Salix hastata</i> 'Wehrhahnii' halberd willow 'Wehrhahnii'	S
<i>Salix lanata</i> Native plant; woolly willow (male form only)	S
<i>Skimmia japonica</i> skimmia	S
<i>Smyrniolus olusatrum</i> Native plant; alexanders †	Bi
<i>Stachyurus chinensis</i> stachyurus	S
<i>Stachyurus praecox</i> stachyurus	S
<i>Vaccinium corymbosum</i> blueberry	S

Natural England states: You can legally collect small quantities of wildflower seed for your own use, but you must get permission from the land's owner, tenant or other authority, as necessary. Although seed-collecting is allowed, you should not dig up native plants – many rare species are protected by law. You can collect seed of even rare plants, but cannot sell / trade seed or progeny.

Key to codes: T tree S shrub C climber B bulb / corm A annual Bi biennial H herbaceous perennial

† denotes an archaeophyte (a naturalised plant introduced into Britain before 1500)

Summer

June – Aug

<i>Achillea</i> species	yarrow	H
<i>Actaea japonica</i>	baneberry	H
<i>Aesculus indica</i>	Indian horse chestnut (resistant to leaf-mining moth)	T
<i>Aesculus parviflora</i>	bottlebrush buckeye	S
<i>Agastache</i> species	giant hyssop	H
<i>Ageratum houstonianum</i>	flossflower	A
<i>Alcea rosea</i>	hollyhock	Bi
<i>Allium</i> species	ornamental and edibles (when allowed to flower)	B
<i>Alstroemeria</i> species	Peruvian lily	B
<i>Amberboa moschata</i>	sweet sultan	A
<i>Amsonia tabernaemontana</i>	eastern bluestar	H
<i>Anchusa azurea</i>	large blue alkanet	A
<i>Anchusa capensis</i>	Cape alkanet	A
<i>Angelica archangelica</i>	angelica	Bi
<i>Angelica gigas</i>	purple angelica	Bi
<i>Angelica sylvestris</i>	Native plant; wild angelica	Bi
<i>Anthemis tinctoria</i>	dyer's chamomile	H
<i>Antirrhinum majus</i>	snapdragon	A or H
<i>Aquilegia</i> species	columbine	H
<i>Arabis allionii</i>	Siberian wallflower	H
<i>Argemone platyceras</i>	crested poppy	A or H
<i>Armeria maritima</i>	Native plant; thrift	H
<i>Aruncus dioicus</i>	goat's beard (male form only)	H
<i>Asparagus officinalis</i>	common asparagus	H
<i>Astrantia major</i>	greater masterwort	H
<i>Borago officinalis</i>	borage	A
<i>Brachyglottis</i> (Dunedin Group) 'Sunshine'	brachyglottis 'Sunshine'	S
<i>Brachyglottis monroi</i>	Monro's ragwort	S
<i>Buddleja davidii</i>	butterfly bush	S
<i>Buddleja globosa</i>	orange ball tree	S
<i>Buphthalmum salicifolium</i>	yellow ox-eye	H
<i>Bupleurum fruticosum</i>	shrubby hare's ear	S
<i>Calamintha nepeta</i>	Native plant; lesser calamint	H
<i>Calendula officinalis</i>	common marigold	A
<i>Callicarpa bodinieri</i> var. <i>giraldii</i>	beautyberry	S
<i>Callistephus chinensis</i>	China aster	A
<i>Calluna vulgaris</i>	Native plant; heather	S
<i>Campanula carpatica</i>	tussock bellflower	H
<i>Campanula glomerata</i>	Native plant; clustered bellflower	H



Photo: RHS / Helen Bostock (six-spot burnet moth on *Verbena bonariensis*).

<i>Campanula lactiflora</i>	milky bellflower	H
<i>Campanula latifolia</i>	Native plant; giant bellflower	H
<i>Campanula medium</i>	Canterbury bells	Bi
<i>Campanula persicifolia</i>	peach-leaved bellflower	H
<i>Campsis radicans</i>	trumpet honeysuckle	C
<i>Caryopteris</i> × <i>clandonensis</i>	caryopteris	S
<i>Catalpa bignonioides</i>	Indian bean tree	T
<i>Catananche caerulea</i>	blue cupidone	H
<i>Centaurea atropurpurea</i>	purple knapweed	H
<i>Centaurea cyanus</i>	cornflower †	A
<i>Centaurea dealbata</i>	mealy centaury	H
<i>Centaurea macrocephala</i>	giant knapweed	H
<i>Centaurea montana</i>	perennial cornflower	H
<i>Centaurea nigra</i>	Native plant; common knapweed	H
<i>Centaurea scabiosa</i>	Native plant; greater knapweed	H
<i>Centranthus ruber</i>	red valerian	H
<i>Centratherum punctatum</i>	Manaos beauty	A
<i>Cerinthe major</i> 'Purpurascens'	honeywort 'Purpurascens'	A
<i>Cirsium rivulare</i> 'Atropurpureum'	purple plume thistle	H
<i>Clarkia unguiculata</i>	butterfly flower	A
<i>Clematis vitalba</i>	Native plant; old man's beard, travellers' joy	C
<i>Cleome hassleriana</i>	spider flower	A
<i>Consolida ajacis</i>	giant larkspur	A
<i>Convolvulus tricolor</i>	dwarf morning glory	C/A
<i>Coreopsis</i> species	tickseed	H or A

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† denotes an archaeophyte (a naturalised plant introduced into Britain before 1500)

Cornus alba red-barked dogwood	S	Geranium species cranesbill (summer-flowering)	H
Cosmos bipinnatus cosmea	A	Geum species avens (summer-flowering)	H
Cosmos sulphureus yellow cosmos	A	Gilia capitata blue thimble flower	A
Crambe cordifolia greater sea kale	H	Glandularia × hybrida garden verbena	A
Crataegus monogyna Native plant; common hawthorn	S or T	Glebionis segetum Native plant; corn marigold †	A
Cucurbita pepo marrow, courgette	A	Gypsophila elegans annual baby's breath	A
Cuphea ignea cigar flower	A	Hebe species hebe	S
Cynara cardunculus including Scolymus Group globe artichoke and cardoon	H	Helenium species Helen's flower	H
Cynoglossum amabile Chinese forget-me-not	H	Helianthus annuus common sunflower (avoid pollen-free cultivars)	A
Dahlia species dahlia	H	Helianthus debilis cucumberleaf sunflower	A
Delosperma floribundum ice plant	H	Heliopsis helianthoides smooth ox-eye	H
Delphinium elatum candle larkspur	H	Heliotropium arborescens common heliotrope	A
Dianthus barbatus sweet william	Bi	Heracleum sphondylium Native plant; hogweed	Bi
Dictamnus albus dittany	H	Hesperis matronalis dame's violet	H
Digitalis species foxglove	Bi	Hydrangea anomala subsp. petiolaris climbing hydrangea	C
Dipsacus fullonum Native plant; common teasel	Bi	Hydrangea paniculata paniculate hydrangea (only cultivars with many fertile flowers, e.g. 'Kyushu', 'Big Ben', 'Floribunda', 'Brussels Lace')	S
Echinacea purpurea purple coneflower	H	Hydrotelephium spectabile & hybrids ice plant	H
Echinops species globe thistle	H	Hydrotelephium telephium Native plant; orpine	H
Echium vulgare Native plant; viper's bugloss	A	Hyssopus officinalis hyssop	S
Elaeagnus angustifolia oleaster	S	Iberis amara Native plant; wild candytuft	A
Erica cinerea Native plant; bell heather	S	Ilex aquifolium Native plant; common holly	T
Erica erigena Irish heath	S	Inula species harvest daisy	H
Erica vagans Native plant; Cornish heath	S	Jasminum officinale common jasmine	C
Erigeron species fleabane	H	Kalmia latifolia mountain laurel	S
Eriophyllum lanatum golden yarrow	H	Knautia arvensis Native plant; field scabious	H
Eryngium alpinum alpine eryngo	H	Knautia macedonica Macedonian scabious	H
Eryngium giganteum Miss Willmott's ghost	Bi	Koelreuteria paniculata pride of India	T
Eryngium planum blue eryngo	H	Lathyrus latifolius broad-leaved everlasting pea	H
Eryngium × tripartitum eryngo	H	Laurus nobilis bay tree	S
Erysimum species wallflower	H or S	Lavandula angustifolia English lavender	S
Escallonia species escallonia	S	Lavandula × intermedia lavandin	S
Eschscholzia californica California poppy	A	Lavandula stoechas French lavender	S
Eupatorium cannabinum Native plant; hemp agrimony	H	Lavatera olbia tree lavatera	S
Eupatorium maculatum Joe Pye weed	H	Lavatera trimestris annual lavatera	A
Euphorbia cornigera horned spurge	H	Leucanthemum × superbum Shasta daisy	H
Euphorbia donii spurge	H	Leucanthemum vulgare Native plant; ox-eye daisy	H
Euphorbia sarawschanica Zeravshan spurge	H	Liatris spicata button snakeroot	H
Ferula communis giant fennel	H	Ligustrum ovalifolium garden privet	S
Foeniculum vulgare Native plant; common fennel †	H	Ligustrum sinense Chinese privet	S
Fragaria × ananassa garden strawberry	H	Limnanthes douglasii poached egg flower	A
Fuchsia species fuchsia – hardy types	S	Limonium platyphyllum broad-leaved statice	H
Gaillardia × grandiflora blanket flower	H	Linaria maroccana annual toadflax	A
Gaura lindheimeri white gaura	H		
Geranium pratense Native plant; meadow cranesbill	H		

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<i>Linaria purpurea</i>	purple toadflax	H
<i>Lobularia maritima</i>	sweet alyssum	A
<i>Lonicera periclymenum</i>	Native plant; common honeysuckle	C
<i>Lychnis coronaria</i>	rose campion	Bi or H
<i>Lychnis flos-cuculi</i>	Native plant; ragged robin	H
<i>Lysimachia vulgaris</i>	Native plant; yellow loosestrife	H
<i>Lythrum salicaria</i>	Native plant; purple loosestrife	H
<i>Lythrum virgatum</i>	wand loosestrife	H
<i>Malope trifida</i>	large-flowered mallow wort	A
<i>Malva alcea</i>	greater musk mallow	H
<i>Malva moschata</i>	Native plant; musk mallow	H
<i>Matthiola incana</i>	hoary stock	Bi
<i>Mentha aquatica</i>	Native plant; water mint	H
<i>Mentha spicata</i>	spearmint	H
<i>Monarda didyma</i>	bergamot	H
<i>Myosotis species</i>	forget-me-not	Bi
<i>Nemophila menziesii</i>	baby blue eyes	A
<i>Nepeta species</i>	catmint	H
<i>Nicotiana alata</i>	flowering tobacco	A
<i>Nicotiana langsdorffii</i>	Langsdorff's tobacco	A
<i>Nicotiana sylvestris</i>	flowering tobacco	Bi
<i>Nigella damascena</i>	love-in-a-mist	A
<i>Nigella hispanica</i>	Spanish fennel flower	A
<i>Oenothera species</i>	evening primrose	Bi
<i>Olearia species</i>	daisy bush	S
<i>Onopordum acanthium</i>	cotton thistle	Bi
<i>Origanum onites</i>	pot marjoram	S
<i>Origanum 'Rosenkuppel'</i>	marjoram 'Rosenkuppel'	H
<i>Origanum vulgare</i>	Native plant; oregano, wild marjoram	H
<i>Paeonia species</i>	peony	H
<i>Papaver orientale</i>	oriental poppy	H
<i>Papaver rhoeas</i>	Native plant; common poppy †	A
<i>Parthenocissus tricuspidata</i>	Boston ivy	C
<i>Penstemon species</i>	beard-tongue	H
<i>Perovskia atriplicifolia</i>	Russian sage	S
<i>Persicaria amplexicaulis</i>	red bistort	H
<i>Persicaria bistorta</i>	Native plant; common bistort	H
<i>Phacelia campanularia</i>	Californian bluebell	A
<i>Phacelia tanacetifolia</i>	fiddleneck	A
<i>Phaseolus coccineus</i>	scarlet runner bean	A
<i>Phlomis species</i>	sage	S
<i>Phlox paniculata</i>	perennial phlox	H
<i>Photinia davidiana</i>	stranvaesia	S
<i>Phuopsis stylosa</i>	Caucasian crosswort	H
<i>Pileostegia viburnoides</i>	climbing hydrangea	C



Photo: RHS / Carol Sheppard (hoverfly on field scabious, *Knautia arvensis*).

<i>Polemonium caeruleum</i>	Native plant; Jacob's ladder	H
<i>Potentilla species</i>	cinquefoil	H or S
<i>Prostanthera cuneata</i>	alpine mint bush	S
<i>Ptelea trifoliata</i>	hop tree	S
<i>Pyracantha species</i>	firethorn	S
<i>Reseda odorata</i>	garden mignonette	A
<i>Ridolfia segetum</i>	false fennel	A
<i>Robinia pseudoacacia</i>	false acacia	T
<i>Rosa species</i>	rose	S
<i>Rosmarinus officinalis</i>	rosemary	S
<i>Rubus fruticosus</i> agg.	Native plant; blackberry	S
<i>Rubus idaeus</i>	Native plant; common raspberry	S
<i>Rudbeckia species</i>	coneflower	H or A
<i>Salvia species</i>	sage	A or H
<i>Sanvitalia procumbens</i>	creeping zinnia	A
<i>Scabiosa</i> spp.	scabious	A/H

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<i>Sidalcea malviflora</i> checkerbloom	H	<i>Vicia faba</i> broad bean	A
<i>Solidago species</i> goldenrod	H	<i>Weigela florida</i> weigelia	S
<i>Sorbus aria</i> Native plant; common whitebeam	T	<i>Zauschneria californica</i> Californian fuchsia	S
<i>Sorbus aucuparia</i> Native plant; mountain ash, rowan	T	<i>Zinnia elegans</i> youth and old age	A
<i>Spiraea japonica</i> Japanese spiraea	S		
<i>Stachys byzantina</i> lamb's ear	H		
<i>Stachys macrantha</i> big sage	H		
<i>Stokesia laevis</i> Stokes' aster	H		
<i>Symphoricarpos albus</i> snowberry	S		
<i>Tagetes patula</i> French marigold	A		
<i>Tamarix ramosissima</i> tamarisk	S	<i>Aconitum carmichaelii</i> Carmichael's monk's hood	H
<i>Tanacetum coccineum</i> pyrethrum	H	<i>Actaea simplex</i> simple-stemmed bugbane	H
<i>Tanacetum vulgare</i> Native plant; tansy †	H	<i>Anemone hupehensis</i> Chinese anemone	H
<i>Telekia speciosa</i> yellow ox-eye	H	<i>Anemone × hybrida</i> Japanese anemone	H
<i>Tetradium daniellii</i> bee-bee tree	T	<i>Arbutus unedo</i> strawberry tree	S or T
<i>Teucrium chamaedrys</i> Native plant; wall germander	H	<i>Campanula poscharskyana</i> trailing bellflower	H
<i>Thymus species</i> thyme	S	<i>Ceratostigma plumbaginoides</i> hardy blue-flowered leadwort	H
<i>Tilia × europaea</i> common lime	T	<i>Chrysanthemum species & hybrids</i> chrysanthemum	H
<i>Tilia maximowicziana</i> lime	T	<i>Clematis heracleifolia</i> tube clematis	C
<i>Tilia oliveri</i> lime	T	<i>Colchicum species</i> autumn crocus	B
<i>Tilia platyphyllos</i> Native plant; broad-leaved lime	T	<i>Crocus species</i> crocus (autumn-flowering types)	B
<i>Tithonia rotundifolia</i> Mexican sunflower	A	<i>Dahlia species & hybrids</i> dahlia	H
<i>Trachymene coerulea</i> blue lace flower	A	<i>Elaeagnus pungens</i> silverthorn	S
<i>Trollius species</i> globeflower	H	<i>Elaeagnus × submacrophylla</i> Ebbinge's silverberry	S
<i>Tropaeolum majus</i> garden nasturtium	A	<i>Fatsia japonica</i> Japanese aralia	S
<i>Verbascum species</i> mullein	Bi	<i>Hedera colchica</i> Persian ivy	C
<i>Verbena bonariensis</i> purple top	H	<i>Hedera helix</i> Native plant; common ivy	C
<i>Verbena rigida</i> slender vervain	A	<i>Helianthus × laetiflorus</i> perennial sunflower	H
<i>Veronica longifolia</i> garden speedwell	H	<i>Leucanthemella serotina</i> autumn ox-eye	H
<i>Veronica spicata</i> speedwell	H	<i>Machaeranthera tanacetifolia</i> tansy-leaf aster	A
<i>Veronicastrum virginicum</i> Culver's root	H	<i>Salvia species</i> sage (autumn-flowering types)	H
<i>Viburnum lantana</i> Native plant; common wayfaring tree	S	<i>Symphotrichum species and hybrids</i> Michaelmas daisy	H
<i>Viburnum opulus</i> Native plant; guelder rose	S	<i>Tilia henryana</i> Henry's lime (one of the last to flower)	T

Autumn

Sept – Oct

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APPENDIX D BNG CONDITION INFORMATION

A.1 CONDITION ASSESSMENT SHEET FOR URBAN HABITATS

2. Vegetation structure is varied, providing opportunities for insects, birds and bats to live and breed. A single ecotone (i.e. scrub, grassland, herbs) should not account for more than 80% of the total habitat area.
3. There is a diverse range of flowering plant species, providing nectar sources for insects. These species may be either native, or non-native but beneficial to wildlife.
4. NB - to achieve GOOD condition, criterion 2 must be satisfied by native species only (rather than non-natives beneficial to wildlife).
5. Invasive non-native species (Schedule 9 of WCA) cover less than 5% of total vegetated area.
6. NB - to achieve GOOD condition, criterion 3 must be satisfied by a complete absence of non-native species (rather than <5% cover).

Condition	Assessment Criteria	Score
Good	• Passes 3 of 3 core criteria; and • Meets the requirements for good condition within criteria 2 and 3.	3
Moderate	• Passes 2 of 3 criteria; or • Passes 3 of 3 core criteria but does not meet the requirements for good condition criteria 2 and 3.	2
Poor	• Passes 0 or 1 of 3 criteria.	1

APPENDIX E LANDSCAPE AND ECOLOGY MANAGEMENT PLAN

This Management Plan has been produced to demonstrate compliance with *BREEAM New Construction 2018* scheme credit LE05 ‘Long Term Ecology Management and Maintenance’.

In accordance with LE05 and BS 42020:2013, where relevant, this management plan includes the following:

- Aims and objectives of management;
- List of features to be managed;
- Appropriate management actions for achieving aims and objectives, including a works schedule;
- Ecological constraints on-site that could influence management;
- Ecological management and monitoring (if required); and
- Body or organisation responsible.

Based on the ecological baseline value of the site the enhancement recommendations and associated management actions focus on providing habitat for foraging birds (including house sparrow) and bats, and nesting habitat for invertebrates. Inclusion and ongoing maintenance of these enhancements should therefore complement the aims of the Reading BAP.

Aims and Objectives

Whilst the development is within a largely urban setting, consideration has been given to the wider network of green infrastructure within Reading. This is not only in the formal areas where nature conservation is the main function, but also within the network of amenity or open space provision, rivers, canals, ponds, allotments, and other green spaces, which contribute so much to local wildlife.

The green spaces created through development form a mosaic of habitat types, quality, size and variety in a larger spatial context that provide green ‘stepping stones’ which are important for both floral and faunal movement, colonisation, and population dynamics within heavily urbanised areas.

Species such as birds and invertebrates, which this management plan targets, benefit from the presence of suitable habitats for foraging, taking refuge, nesting or reproducing on a wider scale.

It is therefore the aim of this management plan to describe the most effective ways in which the habitat enhancements implemented on site are maintained and cared for in the long-term. If implemented effectively, the management plan should accordingly seek to ensure that the site should provide a longstanding resource for local wildlife, in particular those species targeted by the Reading BAO.

Features to be Managed

All ecological enhancement measures have been selected and designed to attract notable and/or protected ecological receptors to complement policy targets for the area, reflecting the objectives of the national and local BAPs.

The following habitat enhancements should be implemented on-site and therefore require management in the long-term:

- Wildlife-friendly landscaping;
- Biodiverse green roof;
- Vertical greening;
- Nest boxes; and
- Invertebrate habitat features.

Management Actions

This section details actions which should ensure adequate maintenance and management of the ecological features on-site.

The following procedures should be carried out to ensure the ecological value of the features is maintained throughout the lifetime of the development. These actions are split into general actions that apply to all features and focused actions specific to certain habitats/features.

General:

- Check enhancement features are intact
- Remove litter
- Re-plant or supplement planting if necessary
- Weed out competitive/invasive species listed on the London Invasive Species Initiative website if necessary.
- Irrigation if necessary after sustained dry periods
- Fertilise planting to maintain healthy growth with organic fertiliser from peat-free sources
- Focused:
 - Clean out bird boxes and invertebrate habitat features
 - Maintenance of green roof should vary depending on the supplier, however, general actions include:
 - Removal of dead vegetation and leaf litter;
 - Removal of any vegetation blocking drainage outlets;
 - Check for degradation of waterproofing system;

- Irrigate if necessary after long dry periods; and
- Ensure that the additional roof enhancements are in place and in good condition.
- Trimming of shrub and trees
- Maintenance of green walls, including:
 - Remove litter
 - Re-plant or supplement planting if necessary
 - Weed out competitive/invasive species listed on the London Invasive Species Initiative website if necessary.

Horticultural Best Practice

Good horticultural practice should be followed at all times on-site, including the use of peat-free composts, and sourcing of plants from local UK nurseries only.

Locally sourced mulch should be used to fertilise the planting only and pesticides and herbicides should not be used.

Timing

Maintenance actions should be completed on a yearly basis during springtime and additionally in late autumn where necessary.

The table below summarises the timings of the management actions for the first five years. Following the initial five year period, the actions should be reassessed and repeated if there is found to be no change in site condition or contemporary best practice.

Season	Management Actions
Spring/summer (Year 1-5)	General actions
	Check enhancement measures are intact such as species boxes, living roof features, vertical planting etc.
	Check if any litter needs removing and dispose of where necessary.
	Re-plant or supplement shrub planting, where plants have died or failed to grow etc
	Weed out competitive species if necessary (e.g., Buddleia and other London Invasive Species Initiative [LISI] species
	Irrigate areas of planting during extended periods of dry hot weather.
	Fertilise areas of planting, using sustainable and organic options, such as locally sourced mulch, to encourage new growth and continual growth of vegetation.
	Focused actions

Season	Management Actions
Spring/ Summer (Year 1-5)	Biodiverse green roof maintenance including removal of any dead vegetation or leaf litter which may smother new growth, removal of vegetation that is blocking the water outlet system and check waterproofing layers is in good condition. The additional roof enhancements, such as rope coils and log piles, should be checked to ensure they are secure and in good condition.
	Check the green wall including removal of any dead vegetation or leaf litter which may smother new growth.
Autumn/Winter (Year 1-5)	General actions
	Cut back and trim any growth of shrub or tree planting that blocks sunlight, entrance holes to nest boxes and invertebrate habitat features or hinders the use of the space by people.
	Focused actions
	Clean out generalist bird boxes and invertebrate habitat features if used during summer. To do this first remove any trace of nesting material then use a non-toxic soap solution with water to clean the internal surfaces. Next rinse with water to remove all traces of soap and leave to dry in natural sunlight.
	Biodiverse green roof maintenance including removal of any dead vegetation or leaf litter which may smother new growth, removal of vegetation that is blocking the water outlet system and check waterproofing layers is in good condition. The additional roof enhancements, such as rope coils and log piles, should be checked to ensure they are secure and in good condition.
	Check the green wall including removal of any dead vegetation or leaf litter which may smother new growth.

Ecological Constraints to Management

The features to be implemented on site, specifically bird boxes and shrub planting, should 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-August 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.

This principle has been embedded in within the above maintenance timings table.

Ecological Monitoring

Due to the scale of the development, it is not considered necessary for the installed ecological features to be monitored by a third party.

It is however recommended that the bird boxes are monitored between March-September each year to check their uptake by nesting birds. This monitoring should involve observation of the boxes for a minimum of 30 minutes once each month. 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 TVERC.

Ecological monitoring is recommended for the first five years. These actions should be repeated and edited as appropriate, following the initial five years. This is the basis of the iterative plan, with edited/added actions decided upon by the ecologist as a function of any unforeseen potential changes that may need to be addressed in the future). Should the management regime need to be extended beyond initial five and the ten years, it would be done so in appropriate stages, considered to be 5 – 10 years, 10 – 15 and up to 25 years.

Responsibility

Maintenance

Maintenance of all enhancement features, other than biodiverse green roofs, should be the responsibility of the management company appointed by the developers.

Biodiverse green roof and/or green wall maintenance should be undertaken by the individual suppliers. This should take place annually for the lifetime of the green roof/wall.

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

Monitoring

The developer should be responsible for monitoring the success of the ecological features installed on site.

The developer should keep a record of all monitoring.

REFERENCES

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RHS (2017) *Perfect for Pollinators* <https://www.rhs.org.uk/science/conservation-biodiversity/wildlife/encourage-wildlife-to-your-garden/plants-for-pollinators>

Bauder (2015); *Flora 3 Seed Mix Leaflet*. Bauder, Ipswich

Royal Horticultural Society (2016); *Perfect for Pollinators: Wildflowers*. RHS, London

Example open fronted bird box. Available from:

<https://www.nhbs.com/eco-robin-open-fronted-nest-box>

Example 32mm hole bird box <https://www.nhbs.com/eco-small-bird-box>

Example of bee post

<https://www.nhbs.com/search?q=bee+post&qview=221104>

Example of bee brick

<https://www.nhbs.com/search?q=bee+brick&qview=221091>

Birdfood Insect Maisonette [https://www.birdfood.co.uk/insect-hotel-capri?utm_source=google_shopping&gclid=CjwKCAjw7--](https://www.birdfood.co.uk/insect-hotel-capri?utm_source=google_shopping&gclid=CjwKCAjw7--KBhAMEiwAxfpWJu0ttU7ycuiztHNDreXFdE7FYanNm8GeWZZUI040jkk1QwsTOMJxoCL-gQA_vD_BwE)

[KBhAMEiwAxfpWJu0ttU7ycuiztHNDreXFdE7FYanNm8GeWZZUI040jkk1QwsTOMJxoCL-gQA_vD_BwE](https://www.birdfood.co.uk/insect-hotel-capri?utm_source=google_shopping&gclid=CjwKCAjw7--KBhAMEiwAxfpWJu0ttU7ycuiztHNDreXFdE7FYanNm8GeWZZUI040jkk1QwsTOMJxoCL-gQA_vD_BwE)