



Elite Ecology

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Land Adjacent to Flint House, Kelshall



Biodiversity Net Gain Report

August 2024



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0. Executive Summary

This report has been prepared at the request of Mr. Stewart Challis (landowner). It relates to the proposed re-development works at Land Adjacent to Flint House, Kelshall, Hertfordshire, SG8 9SE (OS Grid Reference: TL 32849 36771). For this report, a biodiversity impact assessment calculation has been made. This document should be read in conjunction with the completed Excel spreadsheet.

The ecological assessment undertaken by Elite Ecology (May 2024) revealed multiple habitats on site. The baseline habitat map for the site is located within **Appendix C**. The following habitats were recorded on site (in habitat code order):

- **A3.3** – Mixed Scattered Trees.
- **B4** – Improved Grassland.
- **J1.4** – Introduced Shrub.
- **J2.3.2** – Species-poor Hedge with Trees.
- **J2.5** – Wall.
- **J2.4** – Fence.

Habitat Mitigation Score

Biodiversity Unit Type	Baseline Units		Post-Development Units No Enhancements			Post-Development Units With Recommendations			
	On-Site	Off-Site	On-Site	Off-Site	% Net Gain	On-site	Off-site	Statutory biodiversity credits (government-provided)	% Net Gain
Area Habitat	0.32	0.12	0.20	0.12	-37.96	0.20	0.51	N/A	+86.010
Linear habitat – hedgerows or lines of trees	0.23	0.05	0.23	0.05	0.00	0.23	0.74	N/A	+301.26
Linear Habitat – Rivers and Streams	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Habitat Creation and Management

Habitat Creation and management details can be found within **Section 7**. Following the management plan will ensure that habitats meet their target conditions. Habitats that will be implemented are as follows:

- g4 16 – Modified Grassland
- w1g 33 – Line of Trees
- u1e 612 – Fence

Timetables for post-monitoring can be found in **Section 8**.

Species Specific Enhancements

A number of species-specific enhancements can be found in **Section 7.3**.

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1. Introduction

1.1 Report Rationale

This report has been prepared at the request of Mr. Stewart Challis (landowner). It relates to the proposed re-development works at the Land Adjacent to Flint House, Kelshall, Hertfordshire, SG8 9SE (OS Grid Reference: TL 32849 36771). For this report, a biodiversity impact assessment calculation has been made. This document should be read in conjunction with the completed Excel spreadsheet.

1.2 Site Description

The site is situated in the small village of Kelshall in northeastern Hertfordshire, approximately 5km southeast of the town of Royston.

The site measures approximately 0.19ha and contains a number of habitats. These include fence, line of trees, modified grassland, scattered trees, and tall forbs. The habitats on site could have the potential to support a number of protected species. The photographs of the site are found within **Appendix E**.

Within the wider landscape further habitats are present. These come in the form of amenity grass, arable land, hard standing ground, hedgerows, improved grassland, residential dwellings (and their associated gardens/yards), scattered trees, and woodland. This shows that the habitats in the area surrounding the site have the potential to support protected species.

1.3 Proposals

Under the current proposals, the plans are to construct a residential dwelling and garage. Overall, this will result in both the permanent and temporary loss and/or alteration of some of the habitats located on the proposed re-development site.. This will result in both the permanent and temporary loss and/or alteration of some of the habitats located on the proposed re-development site. Please refer to **Appendix A** for the site plans.

Figure 1: An aerial map showing the boundary of the site at the Land Adjacent to Flint House, Kelshall (as shown by the red outline).



Figure 2: An aerial map showing the site at the Land Adjacent to Flint House, Kelshall (as shown by the yellow star) in relation to some of the local landscape.

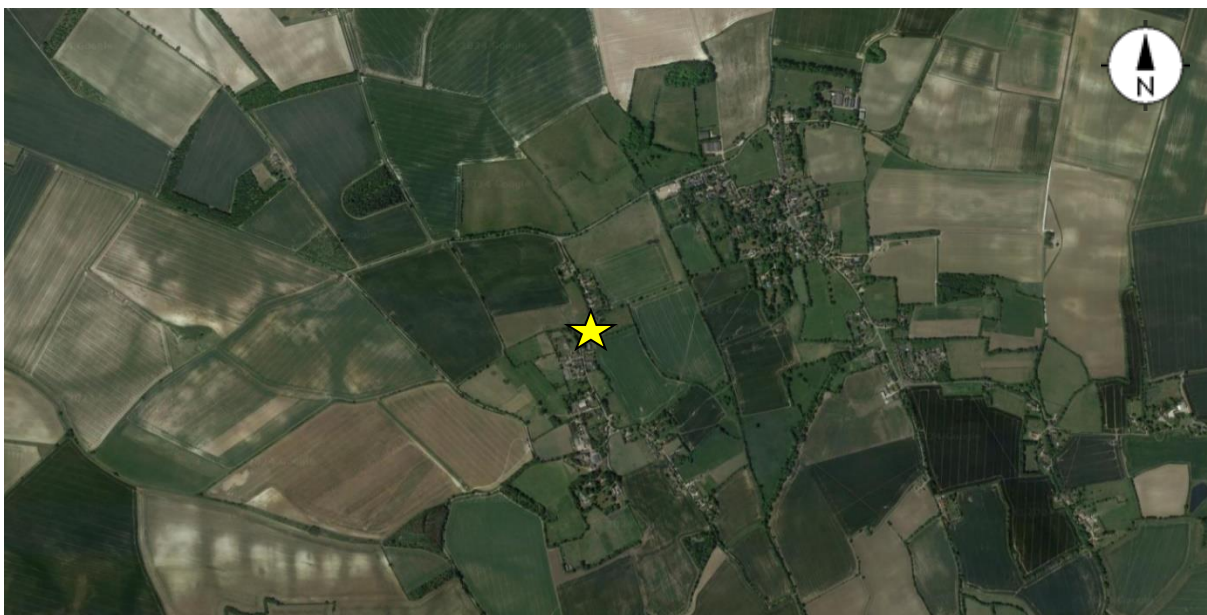
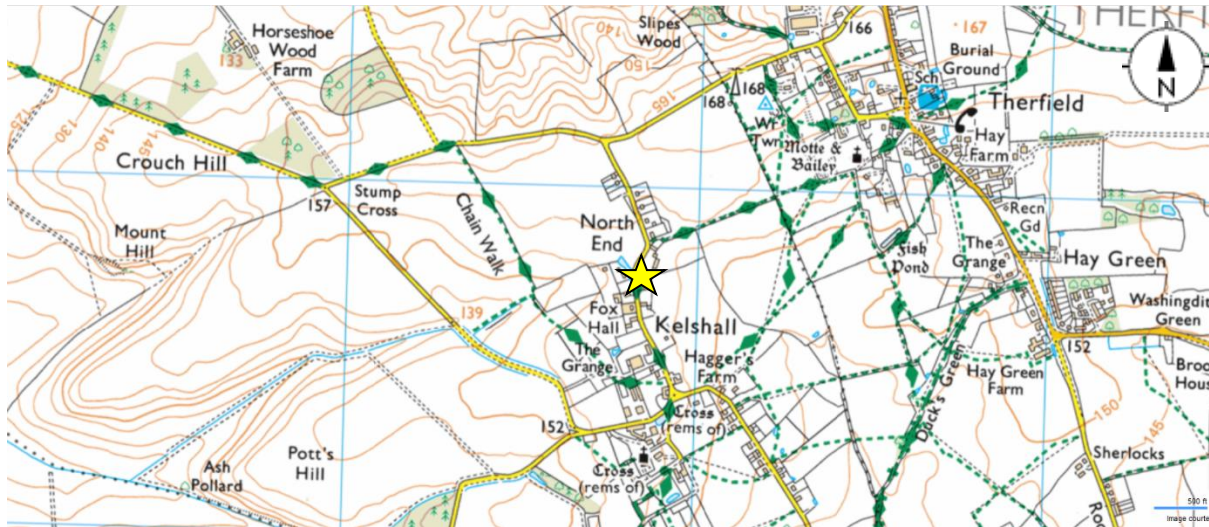


Figure 3: An OS map obtained from Bing showing the location of the Land Adjacent to Flint House, Kelshall (as shown by the yellow star).



1.4 **Scope of Report**

This report aims to:

- Establish the total number of baseline and lost habitat and hedgerow units at the site of the proposed scheme.
- Establish the total number habitat and hedgerow units that are to be created, retained and/or enhanced under landscape and ecological mitigation proposals at the proposed works site.
- Determine whether the proposed scheme will result in a net loss, no net loss, or a net gain for biodiversity.
- Make further recommendations to gain the required 10% minimum net gain for biodiversity.

1.5 **Biodiversity Net Gain Relevant Policies**

The appraisal has been compiled with reference to the following relevant nature conservation legislation, planning policy and the UK Biodiversity Framework from which the protection of sites, habitats and species is derived in England. These are:

- UK Biodiversity Action Plan (UKBAP).
- The Natural Environment and Rural Communities (NERC) Act 2006.
- The UK Post-2010 Biodiversity Framework (2011-2020).
- Biodiversity 2020: A strategy for England's wildlife and ecosystem services.
- The National Planning Policy Framework (NPPF) 2021.
- Environmental Act 2021.
- Local policy.

A full explanation of these policies can be found within **Appendix F**.

2. Methodology

2.1 Personnel

Field surveys have been undertaken by licensed ecologist/s, members of the Chartered Institute of Ecology & Environmental Management (CIEEM) and members of Elite Ecology staff. The field survey was carried out on the 28th of May 2024 by **Mr. Matthew Cotterill**: PG Diploma, BSc (Hons), Ecologist,

The Biodiversity Net Gain Assessment has been carried out by **Mr. Connor Wild** MSc, Senior Ecologist, in line with CIEEM Guidelines on Good practice principles for development (2016), CIEEM A Practical Guide (2019) and BS 8683:2021 - Process for designing and implementing biodiversity net gain. This net gain report and assessment has been reviewed by **Mr. Richard Millington**: BSc (Hons), ACIEEM, MRSB, MArborA, CERPIT, Principal Ecologist.

2.2 Survey of Baseline Habitats and Condition

Habitat typing and condition assessments are undertaken during a Preliminary Ecological Appraisals (PEA) or similar studies. The baseline also takes into account historic records for the site and local area via a desktop study (satellite imagery, previous ecological reports), as well as additional surveys to assess the presence/absence of species in certain situations.

Hedgerows are surveyed using the guidelines set out by the 'Hedgerow Survey Handbook' (Defra, 2007), to assess favourable conditions.

River assessments are carried out through a MoRPH5 Pro survey and River type survey. At least one MoRPH5 is undertaken per reach on site that will be directly or indirectly impacted with a further MoRPH5 undertaken upstream to record a more "natural setting" if required. This data is then processed via Cartographer to give the condition of the rivers on site.

2.3 Calculations of Baseline Habitats

Using Geographic Information Software (GIS), baseline habitats are measured in hectares (ha) using vector layer polygons. These measurements are then input into the DEFRA Statutory Biodiversity Metric Calculation tool. Habitat condition and connectivity are then input into the calculator. The area of habitat retained is then entered into the calculation to give a final sum of baseline units and lost unit.

Each habitat has a base score of 1, this is then multiplied by the size of the habitat (ha). The habitat is then multiplied by its distinctiveness:

- **Very low** – 0
- **Low** – 2
- **Medium** – 4
- **High** – 6

The next multiplier is based on the condition of the habitat:

- **N/A-other/agricultural** – 0
- **Poor** – 1
- **Fairly poor** – 1.5
- **Moderate** – 2
- **Fairly good** – 2.5
- **Good** – 3

2.4 Calculations of Post-development Habitats

The calculation is informed by planning design, landscape plans, and proposed ecological mitigation. Plans are georeferenced into GIS and are similarly measured in hectares (ha) using vector layer polygons. These measurements are then converted into input into the DEFRA Statutory Biodiversity Metric Calculation tool. A target condition will be assigned to each new habitat following the same scores as above. The calculator will generate a proposed time to hit this target condition and difficulty score.

3. Baseline Conditions

3.1 Habitats

The preliminary ecological appraisal survey revealed multiple habitats on site. Condition assessment sheets can be found within **Appendix B**. The baseline habitat map, habitat codes and target notes for the site are located within **Appendix C**. The following habitats were recorded on site (in habitat code order, DAFOR species indicated in bold):

Habitats

Habitats		Condition	Justification
UKHAB	Metric		
g4 16 – Modified Grassland	Modified grassland	Poor	Less than six species per m ² . Sward height is varied. No scrub present. No bare ground is present. Bracken is absent. Invasive non-native species are absent. Passes six criteria. However, criterion 1, essential for moderate condition, has not been achieved.
u1e 612 – Built Linear Features (Fence)	N/A	N/A	Omitted due to size

Linear Habitats

Linear Habitats		Condition	Justification
UKHAB	Metric		
w1g 33 – Line of Trees	Line of trees	Poor	70% of the trees are native. Tree canopy is continuous. No ecological niches present. No undisturbed margin for 6m on both sides of the line of trees. Trees are managed.

3.2 Species

The preliminary ecological appraisal survey revealed that the habitats that have been outlined for the proposed development area does contain protected species potential. The following assessment has also taken into account the adjacent habitats and connectivity to the wider landscape for all protected and rare species.

Species	Further Works	Further Surveys Done	Summary of Results
Amphibians	Surveys	No	Environmental DNA (eDNA) surveys are recommended for ponds within 500m of the site.
Badgers	Precautionary Measures	N/A	Precautionary measures have been recommended to ensure no badgers commuting or foraging within the landscape are harmed by the construction phase.
Bats	Precautionary Measures	No	An artificial lighting plan is required. All lighting must avoid the features of interest for the local bat populations
Birds	Precautionary Measures	N/A	The removal of any vegetation has been recommended for outside of the breeding bird season of March to August, inclusive.
Hedgehogs	Precautionary Measures	N/A	Precautionary measures have been recommended to ensure no hedgehogs are harmed during the construction phase.
Reptiles	Precautionary Measures	N/A	A full presence/absence survey is undertaken on the site to establish if any hotspot areas are identified. This will enable adequate compensation and mitigation to ensure the specimens identified remain in favourable conservation status. This consists of setting artificial refugia around the site, with these allowed to bed-in for two weeks. Following this, seven separate visits are undertaken to establish presence/absence on site.

3.3 Strategic Significance

The table below outlines the Strategic Significance selected for the habitats on site, and the reasoning for this selection within the metric calculation:

Habitats	Strategic Significance	Justification
All Habitats (including Linear Habitats)	Formally Identified in local strategy	Area not identified in the local plan/strategy for nature conservation.

4. Baseline Calculation

4.1 Existing Habitats

The table below outlines the existing site status based on field surveys and satellite imagery.

Redline Boundary Habitats

Habitat Description	Habitat Area (ha)	Distinctiveness	Score	Condition	Score	Baseline Habitat Units	Habitats Retention (ha)			Habitat Units Lost
							Retained	Enhanced	Lost	
Modified grassland	0.14	Low	2	Poor	1	0.28	0.00	0.00	0.14	0.32
TOTALS:	0.14					0.28	0.00	0.00	0.14	0.32

Based on the above information, the on-site habitat biodiversity value is calculated at **0.32** habitat units, with **0.32** units lost during the development. Therefore, **0.00** units will remain.

Blueline Boundary Habitats

Habitat Description	Habitat Area (ha)	Distinctiveness	Score	Condition	Score	Baseline Habitat Units	Habitats Retention (ha)			Habitat Units Lost
							Retained	Enhanced	Lost	
Modified grassland	0.05	Low	2	Poor	1	0.12	0.05	0.00	0.00	0.00
TOTALS:	0.05					0.12	0.05	0.00	0.00	0.00

Based on the above information, the off-site habitat biodiversity value is calculated at **0.12** habitat units, with **0.00** units lost during the development. Therefore, **0.12** units will remain.

4.2 Existing Linear Habitats

Redline Boundary Linear Habitats

Hedgerow Description	Length (km)	Distinctiveness	Score	Condition	Score	Baseline Hedge Units	Hedge Retention (km)			Hedge Units Lost
							Retained	Enhanced	Lost	
Line of trees	0.10	Low	2	Poor	1	0.23	0.10	0.00	0.00	0.00
TOTALS:	0.10					0.22	0.10	0.00	0.00	0.00

Based on the above information, the on-site linear habitat biodiversity value is calculated at **0.23** linear habitat units, with **0.00** units lost during the development. Therefore, **0.23** linear units will remain.

Blueline Boundary Linear Habitats

Hedgerow Description	Length (km)	Distinctiveness	Score	Condition	Score	Baseline Hedge Units	Hedge Retention (km)			Hedge Units Lost
							Retained	Enhanced	Lost	
Line of trees	0.02	Low	2	Poor	1	0.05	0.10	0.00	0.00	0.00
TOTALS:	0.02					0.05	0.10	0.00	0.00	0.00

Based on the above information, the on-site linear habitat biodiversity value is calculated at **0.05** linear habitat units, with **0.00** units lost during the development. Therefore, **0.05** linear units will remain.

5. Proposal Impact without Recommendations

5.1 Proposed Habitats

The table below summarise the habitats of the proposals without any recommendations, along with its target condition.

Redline Boundary Habitats

Habitat Description	Habitat Area (ha)	Target Distinctiveness	Score	Target Condition	Score	Time Till Target Condition		Difficulty of Creation		Habitat Biodiversity Value
						Time (years)	Score	Difficulty	Score	
Developed land; sealed surface	0.05	V.Low	0	N/A - Other	0	0	1.000	Low	1	0.00
Vegetated garden	0.09	Low	2	Condition Assessment N/A	1	1	0.965	Low	1	0.20
TOTALS*	0.14									0.20

The above habitat, valued at **0.20** habitat units, combined with the remaining habitats, valued at **0.00** units, will result in a habitat biodiversity value score of **0.20** habitat units.

Blueline Boundary Habitats

No changes to off site habitats have been proposed.

5.2 Proposed Linear Habitats

Redline Boundary Linear Habitats

No changes to onsite linear habitats have been proposed.

Blueline Boundary Linear Habitats

No changes to offsite linear habitats have been proposed.

5.3 Total Net Unit Change

Redline Boundary Net Unit Change

The Net Unit change for the habitats on site is calculated at **-0.12** which correlates to a **loss** of **37.96%** in habitat biodiversity.

The Net Unit change for the linear habitats on site is calculated at **0.00**, which correlates to **no net loss** in linear habitat biodiversity.

Blueline Boundary Net Unit Change

The Net Unit change for the habitats off site is calculated at **0.00** which correlates to correlates to **no net loss** in habitat biodiversity.

The Net Unit change for the linear habitats off site is calculated at **0.00**, which correlates to **no net loss** in linear habitat biodiversity.

Total Net Unit Change

The Total Net Unit change for the habitats is calculated at **-0.12** which correlates to a **loss** of **37.96%** in habitat biodiversity.

The Total Net Unit change for the linear habitats is calculated at **0.00**, which correlates to **no net loss** in linear habitat biodiversity.

5.4 Trading Rules

With the above proposed habitats, the trading rules are not satisfied. The table below breaks down the factors for passing or failing the trading rules:

Trading Summary			
Distinctiveness Group	Trading Rule	Trading Satisfied	Reason
Very High	Same habitat required – bespoke compensation option	Yes	No habitats of this distinctiveness were identified on site.
High	Same habitat required (=)	Yes	No habitats of this distinctiveness were identified on site.
Medium	Same broad habitat or a higher distinctiveness habitat required (≥)	Yes	No habitats of this distinctiveness were identified on site.
Low	Same distinctiveness or better habitat required (≥)	Yes	A Total Net Unit Change of -0.12 units has been lost by the proposed habitat. Habitats of the same distinctiveness of higher are required.

6. Recommendations

6.1 Habitats

The initial score, without enhancements, resulted in a **-0.12** net gain (**37.96%**) in habitat units, and a **0.00** net loss (**0.00%**) in linear habitat units. The proposals do not meet the DEFRA recommended 10% increase for habitats. Therefore, the following recommendations have been made to increase the value of the site during its operational phase.

6.1 Changes to baseline habitat retentions

Redline Boundary Habitats

No changes to baseline habitat retention within the redline boundary have been made.

Blueline Boundary Habitats

Habitat Description	Habitat Area (ha)	Distinctiveness	Score	Condition	Score	Baseline Habitat Units	Habitats Retention (ha)			Habitat Units Lost
							Retained	Enhanced	Lost	
Modified grassland	0.05	Low	2	Poor	1	0.12	0.00	0.00	0.05	0.12
TOTALS:	0.05					0.12	0.00	0.00	0.05	0.12

The retained offsite modified grassland is to be lost to make way for new habitats. Based on the above information, the off-site habitat biodiversity value is calculated at **0.12** habitat units, with **0.12** units lost during the development. Therefore, **0.00** units will remain.

6.2 Recommended New Habitats

Redline Boundary Habitats

No changes to proposed habitats within the redline boundary have been made.

Blueline Boundary Habitats

Habitat Description	Habitat Area (ha)	Target Distinctiveness	Score	Target Condition	Score	Time Till Target Condition		Difficulty of Creation		Habitat Biodiversity Value
						Time (years)	Score	Difficulty	Score	
Other neutral grassland	0.03	Medium	4	Good	3	10	0.700	Low	1	0.29
Mixed scrub	0.02	Medium	4	Moderate	2	5	0.837	Low	1	0.15
Urban tree	0.02	Medium	4	Moderate	2	27	0.382	Low	1	0.07
TOTALS*	0.05*									0.51
* Area excluding individual Trees										

The above habitat, valued at **0.51** habitat units, combined with the remaining habitats, valued at **0.00** units, will result in a habitat biodiversity value score of **0.51** habitat units.

6.3 Recommended New Linear Habitats

Redline Boundary Linear Habitats

No further recommendations have been made in regards to linear habitats within the redline boundary.

Blueline Boundary Linear Habitats

Hedgerow Description	Length (km)	Target Distinctiveness	Score	Target Condition	Score	Time Till Target Condition		Difficulty of Creation		Hedgerow Biodiversity Value
						Time (years)	Score	Difficulty	Score	
Species-rich native hedgerow	0.09	Medium	4	Moderate	2	5	0.837	Low	1	0.69
TOTALS	0.15									0.69

The above linear habitats, valued at **0.69** linear habitat units, combined with the remaining linear habitats, valued at **0.00** units, will result in a linear habitat biodiversity value score of **0.69** linear habitat units.

6.4 Total Net Unit Change

Redline Boundary Net Unit Change

The Net Unit change for the habitats on site is calculated at **-0.11** which correlates to a **loss** of **37.96%** in habitat biodiversity.

The Net Unit change for the linear habitats on site is calculated at **0.00**, which correlates to **no net loss** in linear habitat biodiversity.

Blueline Boundary Net Unit Change

The Net Unit change for the habitats off site is calculated at **+0.40** which correlates to a **gain** of **347.14%** in habitat biodiversity

The Net Unit change for the linear habitats off site is calculated at **+0.69**, which correlates to a **gain** of **1506.29%** in hedgerow biodiversity

Total Net Unit Change

The Total Net Unit change for the habitats is calculated at **+0.28** which correlates to a **gain** of **37.96%** in habitat biodiversity.

The Total Net Unit change for the linear habitats is calculated at **+0.69**, which correlates to a **gain** of **301.26%** in hedgerow biodiversity

6.5 Trading Rules

With the above recommended habitats, the trading rules are satisfied. The table below breaks down the factors for passing or failing the trading rules:

Trading Summary			
Distinctiveness Group	Trading Rule	Trading Satisfied	Reason
Very High	Same habitat required – bespoke compensation option	Yes	No habitats of this distinctiveness were identified on site.
High	Same habitat required (=)	Yes	No habitats of this distinctiveness were identified on site.
Medium	Same broad habitat or a higher distinctiveness habitat required (≥)	Yes	No unit loss from Medium Distinctiveness Habitats A Total Net Unit Change of 0.51 units has been generated by the proposed habitats and are in surplus to offset Low Distinctiveness Habitats.
Low	Same distinctiveness or better habitat required (≥)	Yes	A Total Net Unit Change of 0.51 units has been generated by the proposed habitat. This in addition with the surplus medium units, the low distinctiveness habitats have been off-set

7. Habitat Creation and Management

7.1 Soil Preparation

SOILS: Subgrade/subsoil to be prepared in accordance with BS 8601:2013 and BS 4428:1989 and scarified or ripped to 300mm depth (excluding root protection areas of retained trees refer to Tree Protection Plan) prior to spreading topsoil to alleviate compaction and promote drainage. Imported and as saved topsoil to be in accordance with BS 3882: 2015 'Multipurpose Grade' with minimum soil organic matter contents 1% greater than the minimal value (or as approved). Imported topsoil (and 'as saved' if requested) is to be laboratory tested to BS 3882:2015 and ameliorated as required to meet the required characteristics as detailed within Table 1 of BS 3882:2015 specification.

Wildflower areas to be unimproved topsoil or low fertility topsoil to BS 3882:2015. Grass areas to be a minimum depth of 150mm, shrub beds 450mm depth, and forestry/transplants 300mm depth. Any weed/grass growth to be sprayed out with appropriate herbicide at least ten days prior to cultivation. All areas to be cultivated to a minimum depth of 150mm removing weeds and rubbish/stones greater than 20mm in size. Incorporate proprietary non peat compost to BSI PAS 100 to 50mm depth evenly worked into soil during cultivation.

7.2 Habitats

7.2.1 Wildflower Meadow

A wildflower meadow is to be incorporated to maximise biodiversity. A variety of wildflower mixes can be found on the [Meadowmania](#) or [Wildflower Turf](#) webpages. It is recommended that [EM2 standard general purpose meadow mixture](#) and [Hedgerow Mixture EH1](#) around the base of the trees, or similar is used. Seeding is to be sown at a rate of 4g/m². A list of recommended species will be provided in **Section 8**. This must be connected to other habitat features to ensure beneficial invertebrates, such as bees and butterflies, can find and utilize this habitat. This is due to some species not crossing open areas, meaning connectivity with linear habitat features is critical.

These areas will be mown once a year:

- **Autumn cut** - Cut back to height of 7.5cm between the end of August and late November.

Management of the habitats will avoid mowing of the entire space, to allow patches of taller/rough grassland patches and flowering to take place.

7.2.2 Scrub

To improve floral diversity on site, mixed scrub is to be incorporated into the scheme. This scrub will provide nesting areas for birds, more foraging for bats and birds, and shelter for small mammals and reptiles that are located on site. Mixed scrub is to include a mix of the following.

Scientific Name	Common name	Native	Density per m ²
<i>Frangula alnus</i>	Alder buckthorn	Yes	2
<i>Fagus sylvatica</i>	Beech	Yes	2
<i>Prunus spinosa</i>	Blackthorn	Yes	2
<i>Buxus sempervirens</i>	Box	Yes	2
<i>Rhamnus catharticus</i>	Buckthorn	Yes	2
<i>Cornus sanguinea</i>	Dogwood	Yes	2
<i>Corylus avellana</i>	Hazel	Yes	2
<i>Prunus avium</i>	Wild cherry	Yes	2

Mixed scrub is to be planted in accordance with BS 3936 and handled in accordance with NPS 'Handling & Establishment' guidelines and planted in accordance with BS 4428:1989.

Specimens are to be planted at two plants per m². Scrub is to be planted at random to avoid the creation of wind tunnels. Gaps within the scrub will be colonised as the scrub matures. Mixed scrub is to be under-seeded with [Woodland Mixture EW1](#), or similar, sown at a rate of 4g/m².

New scrub should be left for a fifteen-year period to allow the habitat to reach maturity. Once this fifteen-year period has passed management is to be implemented.

Management for scrub is to be rotational, with one third (1/3) of the scrub coppiced every three years. For example, coppice 1/3, then three years hence coppice another 1/3, and finally coppice the remaining 1/3 after another three years. This process should then be repeated. This low-level management will allow for variation in the structure and maturity of the scrub whilst ensuring the habitat is still available for use by wildlife. Removal of scrub should be undertaken between November and January to avoid the breeding bird season.

7.2.3 Scattered Trees

New scattered trees are to be planted within the development; these are to consist of the following:

Thirty-two medium sized trees: Downy birch (*Betula pubescens*), rowan (*Sorbus aucuparia*), silver birch (*Betula pendula*), and wild cherry (*Prunus avium*), Once planted trees are to be left to mature.

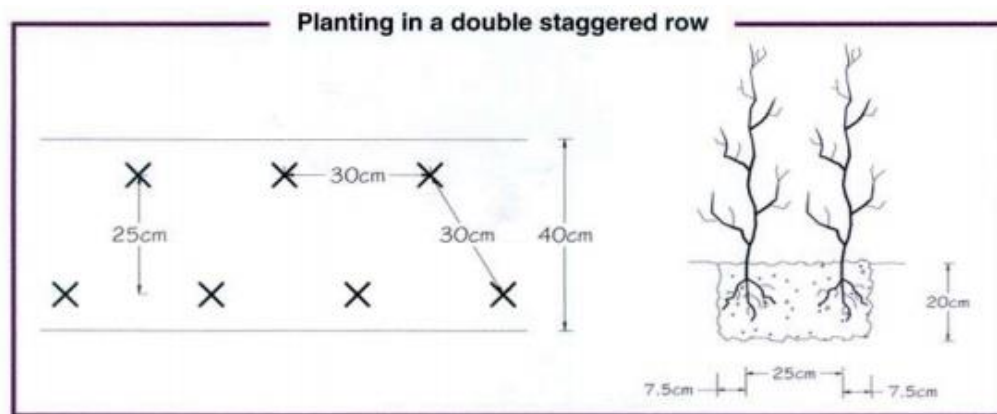
7.2.4 Hedgerows

New hedgerows are to be incorporated. The new hedgerows are to be planted along the north-eastern and the south-eastern boundaries (replacing the existing hedge and improving the visibility of the adjacent A428).

A typical mix of shrubs to create a traditional hedgerow is: 50% hawthorn (*Crataegus monogyna*), 25% hazel (*Corylus avellana*), 15% field maple (*Acer campestre*), 2% holly (*Ilex aquifolium*), 2% wild privet (*Ligustrum vulgare*), 2% guelder rose (*Viburnum opulus*), 2% dog rose (*Rosa canina*), and 2% buckthorn (*Rhamus frangula*) for every 30m of the hedge. One tree is to be incorporated into the hedge every 15m.

Hedgerows are to be planted at five plants per metre in a staggered double row, with 33cm between each plant along the row and 40cm between the rows.

Figure 3: Planting a double Staggered hedge, taken from Planting a Native Hedgerow, by Wycombe District Council 2008



Further recommendations on the hedge include the way it should be managed:

1st year

- Weed around the base of the shrub to prevent competition.
- In late summer any shrubs that have died should be replaced in the autumn.
- In the shrub's first spring cut the hedge down to 45-60cm off the ground to promote a thicker hedge.

Long-term

Leaving a wild, undisturbed margin adjacent to the hedgerow, ideally 2m will encourage growth around the base of the hedge, providing cover for small mammals and nesting sites for birds.

Hedgerow tops should be cut by chainsaw and **never** flailed as this can severely damage and impede the growth of a hedge after repeated cuts. The hedge must not be cut must not be cut under two metres in height.

Hedgerows should be cut in 1/3 sections offset by a year, and then re-cut every five years. This will ensure that the health of the hedgerow is maintained.

7.2.5 Control of Aggressive Weeds

Any weeds which grow on site and are thought to be aggressive and pose a threat to the success of the planted trees should be eradicated as soon as possible. These will be identified within a plant identification survey undertaken twice yearly; one in March and one in July. It will be necessary to remove all weeds found on site by hand during the first three years of the project, until the new trees are mature enough to survive. Any invasive species that appear on site will require eradication as soon as possible. The identification of any invasive species will take place within a plant identification survey undertaken twice yearly; one in March and one in July.

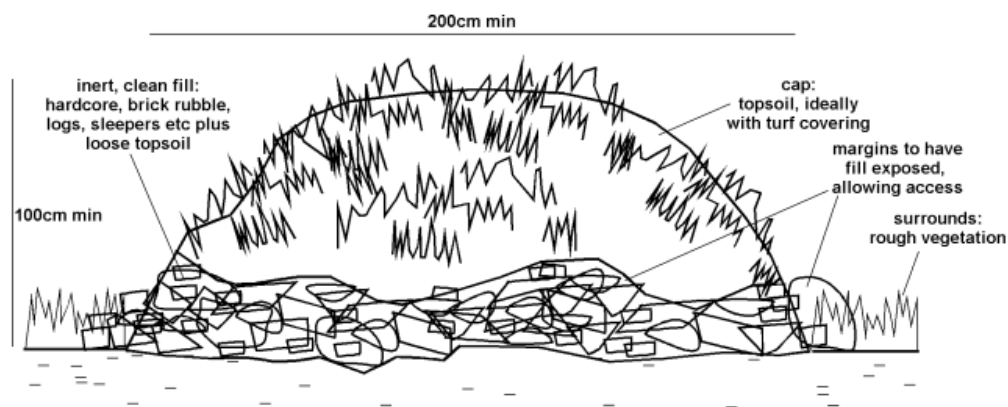
7.3 Species Specific Enhancements

The following is a list of enhancements that are to be implemented in site. Additional features may be required following the completion of outstanding surveys. This document will be updated if required.

7.3.1 Amphibians

The development is to incorporate one hibernacula into the design scheme. These are usually comprised of rubble, rock, log piles, and earth banks. An example design for the hibernacula can be seen within **Figure 4**.

Figure 4: A diagram illustrating the recommended hibernacula (GCN Mitigation Guidelines).



7.3.2 Bats

The development is to incorporate two Intergrated Eco Bat Boxes or similar. Boxes can be purchased by emailing admin@eliteecology.co.uk. Including these boxes will providing further roosting opportunities. These should avoid any artificial lighting, whilst being sighted facing east, south-east, south, south-west, and/or west.

Artificial lighting **must avoid** linear features. If it is necessary to include artificial lighting in areas overlooking both hedgerows and trees, then this must include sensors to be triggered by larger bodies only.

7.3.3 Birds

The development site is to be enhanced for birds by installing a variety of bird boxes on site. The development is to incorporate a minimum of the following:

- One Apex Bird Box .
- One Apex Robin Box.

Boxes can be purchased by emailing admin@eliteecology.co.uk.

7.3.4 Hedgehogs (*Erinaceus europaeus*)

The site is to be enhanced for the local hedgehog population by one Eco Hedgehog Nest Boxes around the site. This will create more opportunities for hedgehogs within the local landscape. Boxes can be purchased by emailing admin@eliteecology.co.uk.

Small gaps are to be left within any boundary fencing to enable the specimens to continue to commute through the area (an example can be found within **Figure 5**). This will ensure that the local hedgehog populations do not become fragmented within the local landscape.

Figure 5: An image of an example hedgehog tunnel (obtained from RSPB).



7.3.5 Invertebrates

At present, the site is not considered to be of any importance to local invertebrate populations. In conjunction with the habitat creation the site is to incorporate two bug hotels and two bee boxes. This will enhance the site for the local invertebrate populations, which will thus attract species further up in the trophic level. Boxes can be purchased by emailing admin@eliteecology.co.uk.

7.3.6 Reptiles

Hibernacula are be scattered though the site. These hibernacula can be made of cut timber, brash, inert hardcore, bricks, rubble, rocks, tree roots, and building rubble. A minimum of three of these are advised for this project. The key design features include:

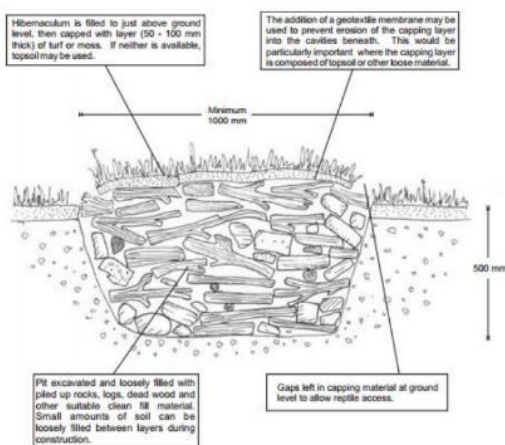
- A sunny location.
- A well-drained section of the site.
- One of the long sides faces south.
- Access for reptiles through openings.
- Locate within suitable habitat (rough grassland and scrubland in this scenario).
- Minimal anthropogenic disturbance.
- Measure at least 4m length x 2m width x 1m height, but the larger the better.

Egg laying site for grass snakes should be incorporated on site. Egg laying sites are to be constructed with heaps of warm, humid, decomposing organic material such as manure, compost, grass clippings, sawdust, garden waste, or cut reeds. Heaps should be at least 1m³. It is also necessary to replenish existing sites with fresh material or to regularly create new egg-laying sites. Heaps that are used by grass snakes should not be interfered with between June and September, to avoid harm. Replenishing is best done in April to May or October, and normally should be done at least once every two years. Two of these are recommended to be placed off site.

Figure 7: A diagram illustrating the recommended reptile hibernacula

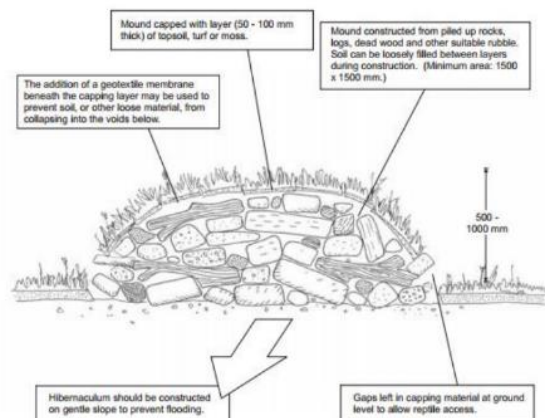
Hibernaculum on free-draining ground

Where ground conditions allow, the hibernaculum should be incorporated into a shallow pit. This design is more likely to remain frost-free, and will be less obtrusive and thus unlikely to be subject to interference.



Hibernaculum on impermeable ground

Where ground conditions are impermeable, then an 'above-ground' or mounded design should be utilised in order to prevent the hibernaculum from flooding. This design should also be used if it is not possible to excavate a pit for any other reason.



8. Timing, Phasing, and Duration of Conservation Measures

8.1 Construction Phase

Creation	Timing	Species
Wildflower planting	Plant May to September.	General Purpose Mix Wildflowers total 20% Borage (<i>Borago officinalis</i>) 1.4%, corn poppy (<i>Papaver Rhoeas</i>) 2.0%, cornflower (<i>Cenaturea Cyanus</i>) 1.6%, lesser knapweed (<i>Centaurea nigra</i>) 0.6%, musk mallow (<i>Malva moschata</i>) 0.4%, ox eye daisy (<i>Leucanthemum Vulgare</i>) 0.6%, red campion (<i>Silene Dioica</i>) 3.0%, ribwort plantain (<i>Plantago lanceolata</i>) 2.4%, salad burnet (<i>Sanguisorba Minor</i>) 3.0%, selfheal (<i>Prunella Vulgaris</i>) 1.0%, white campion (<i>Silene Alba</i>) 2.4%, wild red clover (<i>Trifolium pratense</i>) 1.0%, and yarrow, (<i>Achillea millefolium</i>) 0.6%. Grasses (Total 80%) Chewings fescue (<i>Festuca rubra</i> subsp. <i>commutata</i>) 24%, common bent (<i>Agrostis capillaris</i>) 4.4%, crested dogs tail (<i>Cynosurus cristatus</i>) 1.6%, slender creeping red fescue (<i>Festuca rubra</i> subsp. <i>litoralis</i>) 20%, strong creeping red fescue (<i>Festuca rubra</i>) 28%, sweet vernal grass (<i>Anthoxanthum odoratum</i>) 1%, and yellow oat grass (<i>Trisetum flavescens</i>) 1%. Woodland Mix Flowers total 100%: bluebell seed (<i>Hyancith non Scripta</i>) 2.5%, common agrimony (<i>Agrimonia Eupotar</i>) 5.0%, hedge bedstraw (<i>Galium Mollugo</i>) 15.0%, hedge garlic (<i>Alliaria Petiolata</i>) 10.0%, hedge woundwort (<i>Stachys Sylvatica</i>) 2.5%, herb bennet (<i>Geum Urbanum</i>) 5.0%, nettle leaved bell flower (<i>Campanula Trachnium</i>) 1.0%, ragged robin (<i>Lychnis Flos Cuculi</i>) 1.0%, red campion (<i>Silene Dioica</i>) 17.0%, self heal (<i>Prunella Vulgaris</i>) 17.0%, square st. John's wort (<i>Hypericum tetrapterum</i>) 0.5%, sweet cicely (<i>Myrrhis Odorta</i>) 6.0%, upright hedge parsley (<i>Torilis Japonica</i>) 6.0%. Welsh Poppy (<i>Meconopsis Cambria</i>) 0.25%, wild angelica (<i>Angelica Sylvestri</i>) 2.0%, wild foxglove (<i>Digitalis Purpurea</i>) 7.5%, and wood sage (<i>Teucrium Scorodonia</i>) 1.5%.
Individual Trees	Plant between October and April.	Thirty-two medium sized trees: Downy birch (<i>Betula pubescens</i>), rowan (<i>Sorbus aucuparia</i>), silver birch (<i>Betula pendula</i>), wild cherry (<i>Prunus avium</i>),
New Scrub Planting	Plant between October and April.	Alder buckthorn (<i>Frangula alnus</i>), beech (<i>Fagus sylvatica</i>), blackthorn (<i>Prunus spinosa</i>), box (<i>Buxus sempervirens</i>), buckthorn (<i>Rhamnus catharticus</i>), common hazel (<i>Corylus avellana</i>), dogwood (<i>Cornus sanguinea</i>), and wild cherry (<i>Prunus avium</i>).
Hedge	Plant between October and April.	50% hawthorn (<i>Crataegus monogyna</i>), 25% hazel (<i>Corylus avellana</i>), 15% field maple (<i>Acer campestre</i>), 2% holly (<i>Ilex aquifolium</i>), 2% wild privet (<i>Ligustrum vulgare</i>), 2% guelder rose (<i>Viburnum opulus</i>), 2% dog rose (<i>Rosa canina</i>), and 2% buckthorn (<i>Rhamus frangula</i>) for every 30m of the hedge.

8.2 Operational Phase

Management	Reason for and Frequency of schedule	Yearly Management									
Wildflowers	To maximise biodiversity. Beneficial to invertebrates.	Year 1- Sow May to September	Year 2- Autumn - Cut back to height of 7.5cm only and complete this cut between the end of August and late November.	Year 3- Autumn - Cut back to height of 7.5cm only and complete this cut between the end of August and late November.	Year 4- Autumn - Cut back to height of 7.5cm only and complete this cut between the end of August and late November.	Year 5- Autumn - Cut back to height of 7.5cm only and complete this cut between the end of August and late November.	Year 6- Autumn - Cut back to height of 7.5cm only and complete this cut between the end of August and late November.	Year 7- Autumn - Cut back to height of 7.5cm only and complete this cut between the end of August and late November.	Year 8- Autumn - Cut back to height of 7.5cm only and complete this cut between the end of August and late November.	Year 9- Autumn - Cut back to height of 7.5cm only and complete this cut between the end of August and late November.	Year 10- Autumn - Cut back to height of 7.5cm only and complete this cut between the end of August and late November.
		Year 11- Autumn - Cut back to height of 7.5cm only and complete this cut between the end of August and late November.	Year 12- Autumn - Cut back to height of 7.5cm only and complete this cut between the end of August and late November.	Year 13- Autumn - Cut back to height of 7.5cm only and complete this cut between the end of August and late November.	Year 14- Autumn - Cut back to height of 7.5cm only and complete this cut between the end of August and late November.	Year 15- Autumn - Cut back to height of 7.5cm only and complete this cut between the end of August and late November.	Year 16- Autumn - Cut back to height of 7.5cm only and complete this cut between the end of August and late November.	Year 17- Autumn - Cut back to height of 7.5cm only and complete this cut between the end of August and late November.	Year 18- Autumn - Cut back to height of 7.5cm only and complete this cut between the end of August and late November.	Year 19- Autumn - Cut back to height of 7.5cm only and complete this cut between the end of August and late November.	Year 20- Autumn - Cut back to height of 7.5cm only and complete this cut between the end of August and late November.
		Year 21- Autumn - Cut back to height of 7.5cm only and complete this cut between the end of August and late November.	Year 22- Autumn - Cut back to height of 7.5cm only and complete this cut between the end of August and late November.	Year 23- Autumn - Cut back to height of 7.5cm only and complete this cut between the end of August and late November.	Year 24- Autumn - Cut back to height of 7.5cm only and complete this cut between the end of August and late November.	Year 25- Autumn - Cut back to height of 7.5cm only and complete this cut between the end of August and late November.	Year 26- Autumn - Cut back to height of 7.5cm only and complete this cut between the end of August and late November.	Year 27- Autumn - Cut back to height of 7.5cm only and complete this cut between the end of August and late November.	Year 28- Autumn - Cut back to height of 7.5cm only and complete this cut between the end of August and late November.	Year 29- Autumn - Cut back to height of 7.5cm only and complete this cut between the end of August and late November.	Year 30- Autumn - Cut back to height of 7.5cm only and complete this cut between the end of August and late November.
New scrub management	Allow for variation in the structure and maturity of the scrub whilst ensuring the habitat is still available for use by wildlife.	Year 1- Plant recommended species. Leave to mature.	Year 2- No action.	Year 3- No action.	Year 4- No action.	Year 5- No action.	Year 6- No action.	Year 7- No action.	Year 8- No action.	Year 9- No action.	Year 10- No action.
		Year 11- No action.	Year 12- No action.	Year 13- No action.	Year 14- No action.	Year 15- Select one third of the new mixed scrub for coppice. Re-coppice section every nine years.	Year 16- No action.	Year 17- No action.	Year 18- Select second third of the new mixed scrub for coppice. Re-coppice section every nine years.	Year 19- No action.	Year 20- No action.
		Year 21- Select last third of the new mixed scrub for coppice. Re-coppice section every nine years.	Year 22- No action.	Year 23- No action.	Year 24- Select one third of the new mixed scrub for coppice. Re-coppice section every nine years.	Year 25- No action.	Year 26- No action.	Year 27- Select second third of the new mixed scrub for coppice. Re-coppice section every nine years.	Year 28- No action.	Year 29- No action.	Year 20- Select last third of the new mixed scrub for coppice. Re-coppice section every nine years.

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Hedgerows Management	Allow for structural integrity of the hedge and ensure the hedge is still available for wildlife.	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
		Plant hedgerow be made up of at least five different native species. These hedgerows will be planted at 30cm intervals.	Weed around the base of the shrub to prevent competition. In late summer, any shrubs that have died will be replaced in the autumn. In the shrub's first spring cut the hedge down to 45-60cm off the ground to promote a thicker hedge. Leave a wild undisturbed margin adjacent to the hedge.	Weed around the base of the shrub to prevent competition. In late summer, any shrubs that have died will be replaced in the autumn. Allow the hedge to reach an average height of 2m with a width of 1.5m. Leave a wild undisturbed margin adjacent to the hedge.	Weed around the base of the shrub to prevent competition. In late summer, any shrubs that have died will be replaced in the autumn. Allow the hedge to reach an average height of 2m with a width of 1.5m. Leave a wild undisturbed margin adjacent to the hedge.	Weed around the base of the shrub to prevent competition. In late summer, any shrubs that have died will be replaced in the autumn. Allow the hedge to reach an average height of 2m with a width of 1.5m. Leave a wild undisturbed margin adjacent to the hedge.	Cut the 1 st 1/3 of the hedge. Leave deadwood where it has been felled or move into a shaded area. Re-cut section every five years. Weed around the base of the shrub to prevent competition. Leave a wild undisturbed margin adjacent to the hedge.	Cut the 2 nd 1/3 of the hedge. Leave deadwood where it has been felled or move into a shaded area. Re-cut section every five years. Weed around the base of the shrub to prevent competition. Leave a wild undisturbed margin adjacent to the hedge.	Cut the 3 rd 1/3 of the hedge. Leave deadwood where it has been felled or move into a shaded area. Re-cut section every five years. Weed around the base of the shrub to prevent competition. Leave a wild undisturbed margin adjacent to the hedge.	Weed around the base of the shrub to prevent competition. Leave a wild undisturbed margin adjacent to the hedge.	Weed around the base of the shrub to prevent competition. Leave a wild undisturbed margin adjacent to the hedge.
		Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
		Cut the 1 st 1/3 of the hedge. Leave deadwood where it has been felled or move into a shaded area. Re-cut section every five years. Weed around the base of the shrub to prevent competition. Leave a wild undisturbed margin adjacent to the hedge.	Cut the 2 nd 1/3 of the hedge. Leave deadwood where it has been felled or move into a shaded area. Re-cut section every five years. Weed around the base of the shrub to prevent competition. Leave a wild undisturbed margin adjacent to the hedge.	Cut the 3 rd 1/3 of the hedge. Leave deadwood where it has been felled or move into a shaded area. Re-cut section every five years. Weed around the base of the shrub to prevent competition. Leave a wild undisturbed margin adjacent to the hedge.	Weed around the base of the shrub to prevent competition. Leave a wild undisturbed margin adjacent to the hedge.	Weed around the base of the shrub to prevent competition. Leave a wild undisturbed margin adjacent to the hedge.	Cut the 1 st 1/3 of the hedge. Leave deadwood where it has been felled or move into a shaded area. Re-cut section every five years. Weed around the base of the shrub to prevent competition. Leave a wild undisturbed margin adjacent to the hedge.	Cut the 2 nd 1/3 of the hedge. Leave deadwood where it has been felled or move into a shaded area. Re-cut section every five years. Weed around the base of the shrub to prevent competition. Leave a wild undisturbed margin adjacent to the hedge.	Cut the 3 rd 1/3 of the hedge. Leave deadwood where it has been felled or move into a shaded area. Re-cut section every five years. Weed around the base of the shrub to prevent competition. Leave a wild undisturbed margin adjacent to the hedge.	Weed around the base of the shrub to prevent competition. Leave a wild undisturbed margin adjacent to the hedge.	Weed around the base of the shrub to prevent competition. Leave a wild undisturbed margin adjacent to the hedge.
		Year 20	Year 21	Year 22	Year 23	Year 24	Year 25	Year 27	Year 28	Year 29	Year 30
		Cut the 1 st 1/3 of the hedge. Leave deadwood where it has been felled or move into a shaded area. Re-cut section every five years. Weed around the base of the shrub to prevent competition. Leave a wild undisturbed margin adjacent to the hedge.	Cut the 2 nd 1/3 of the hedge. Leave deadwood where it has been felled or move into a shaded area. Re-cut section every five years. Weed around the base of the shrub to prevent competition. Leave a wild undisturbed margin adjacent to the hedge.	Cut the 3 rd 1/3 of the hedge. Leave deadwood where it has been felled or move into a shaded area. Re-cut section every five years. Weed around the base of the shrub to prevent competition. Leave a wild undisturbed margin adjacent to the hedge.	Weed around the base of the shrub to prevent competition. Leave a wild undisturbed margin adjacent to the hedge.	Weed around the base of the shrub to prevent competition. Leave a wild undisturbed margin adjacent to the hedge.	Cut the 1 st 1/3 of the hedge. Leave deadwood where it has been felled or move into a shaded area. Re-cut section every five years. Weed around the base of the shrub to prevent competition. Leave a wild undisturbed margin adjacent to the hedge.	Cut the 2 nd 1/3 of the hedge. Leave deadwood where it has been felled or move into a shaded area. Re-cut section every five years. Weed around the base of the shrub to prevent competition. Leave a wild undisturbed margin adjacent to the hedge.	Cut the 3 rd 1/3 of the hedge. Leave deadwood where it has been felled or move into a shaded area. Re-cut section every five years. Weed around the base of the shrub to prevent competition. Leave a wild undisturbed margin adjacent to the hedge.	Weed around the base of the shrub to prevent competition. Leave a wild undisturbed margin adjacent to the hedge.	Weed around the base of the shrub to prevent competition. Leave a wild undisturbed margin adjacent to the hedge.

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Control of Aggressive Weeds	Any weeds which grow on site and are thought to be aggressive and pose a threat to the success of the planted trees should be eradicated. Plant ID survey undertaken twice yearly.	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
		Plant ID survey: March	Plant ID survey: March	Plant ID survey: March	Plant ID survey: March	Plant ID survey: March	Plant ID survey: March	Plant ID survey: March	Plant ID survey: March	Plant ID survey: March	Plant ID survey: March
		Plant ID survey: July	Plant ID survey: July	Plant ID survey: July	Plant ID survey: July	Plant ID survey: July	Plant ID survey: July	Plant ID survey: July	Plant ID survey: July	Plant ID survey: July	Plant ID survey: July
		Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
		Plant ID survey: March	Plant ID survey: March	Plant ID survey: March	Plant ID survey: March	Plant ID survey: March	Plant ID survey: March	Plant ID survey: March	Plant ID survey: March	Plant ID survey: March	Plant ID survey: March
		Plant ID survey: July	Plant ID survey: July	Plant ID survey: July	Plant ID survey: July	Plant ID survey: July	Plant ID survey: July	Plant ID survey: July	Plant ID survey: July	Plant ID survey: July	Plant ID survey: July
		Year 21	Year 22	Year 23	Year 24	Year 25	Year 26	Year 27	Year 28	Year 29	Year 30
		Plant ID survey: March	Plant ID survey: March	Plant ID survey: March	Plant ID survey: March	Plant ID survey: March	Plant ID survey: March	Plant ID survey: March	Plant ID survey: March	Plant ID survey: March	Plant ID survey: March
		Plant ID survey: July	Plant ID survey: July	Plant ID survey: July	Plant ID survey: July	Plant ID survey: July	Plant ID survey: July	Plant ID survey: July	Plant ID survey: July	Plant ID survey: July	Plant ID survey: July

8.3 Post-works - Habitat Condition Monitoring Timetable

Post-Monitoring Type	Colour
Progression Check	
Assessing if habitat has met target condition	
Monitoring if Target condition is retained	

Habitat	Year														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Wildflower Meadow															
Individual Trees															
Mixed Scrub															
Hedgerow															
Habitat	Year														
	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Wildflower Meadow															
Individual Trees															
Mixed Scrub															
Hedgerow															

9. Good Practice Principles for Development

9.1 Principle 1: Mitigation Hierarchy

Surveys for required for this site. At the time of this report write up this principle has not been met.

9.2 Principle 2: Irreplaceable Habitats

No irreplaceable habitats occur on site. Habitats on site are common and poor quality. This report has offered recommendations for habitats of a higher standard while staying in the same broad habitat types.

9.3 Principle 3: Inclusivity

Feedback from the stakeholders is welcome and this document is to be updated to fit requirements. This Biodiversity Net Gain Report has included recommendations to benefit the site while allowing it to be used for its intended purpose.

9.4 Principle 4: Risks

Post monitoring and a management scheme has been recommended to ensure habitats meet conditions.

9.5 Principle 5: Measurable Net Gain Contribution

Redline Boundary Net Unit Change

The Net Unit change for the habitats on site is calculated at **-0.11** which correlates to a **loss** of **37.96%** in habitat biodiversity.

The Net Unit change for the linear habitats on site is calculated at **0.00**, which correlates to **no net loss** in linear habitat biodiversity.

Blueline Boundary Net Unit Change

The Net Unit change for the habitats off site is calculated at **+0.40** which correlates to a **gain** of **347.14%** in habitat biodiversity

The Net Unit change for the linear habitats off site is calculated at **+0.69**, which correlates to a **gain** of **1506.29%** in hedgerow biodiversity

Total Net Unit Change

The Total Net Unit change for the habitats is calculated at **+0.28** which correlates to a **gain** of **37.96%** in habitat biodiversity.

The Total Net Unit change for the linear habitats is calculated at **+0.69**, which correlates to a **gain** of **301.26%** in hedgerow biodiversity

9.6 Principle 6: Best Outcomes for Biodiversity

Surveys are required for this site. At the time of this report write up this principle has not been met. However, if recommendations are implemented on site this will exceeds what is currently on site offering more habitats in better condition and species-specific enhancements.

9.7 Principle 7: Be Additional

At the time of this report write up no species-specific surveys have been undertaken. Therefore, the recommendations are not additional. Habitats and enhancements recommended will improve the site for local fauna. Once surveys have been completed this document will be updated to include any proposed mitigation. If no mitigation is proposed this principle will be met. If mitigation is required, and is similar to this document, then habitats and enhancements will be discounted to lower the current percentage until a 10% net gain minimum is reached, for example, if a mixed scrub is required as mitigation that is 0.02ha then this will be taken out of the 0.05ha. This will be recorded at a habitat that scores 0 units as to not reduce the site area. If the discounted habitats take the calculation under 10% additional habitats will be recommended.

9.8 Principle 8: Net Gain Legacy

Post monitoring and a management scheme has been recommended to ensure habitats meet conditions. This will cover a thirty-year period.

9.9 Principle 9: Sustainability

No green infrastructure has been proposed.

9.10 Principle 10: Transparency

Feedback from the stakeholders is welcome and this document is to be updated to fit requirements. This Biodiversity Net Gain Report has included recommendations to benefit the site while allowing it to be used for its intended purpose.

10. References

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11. Appendices

Appendix A: Site Plans

Appendix B: Baseline Conditions

Appendix C: Baseline Habitat Map

Appendix D: New Habitat Maps

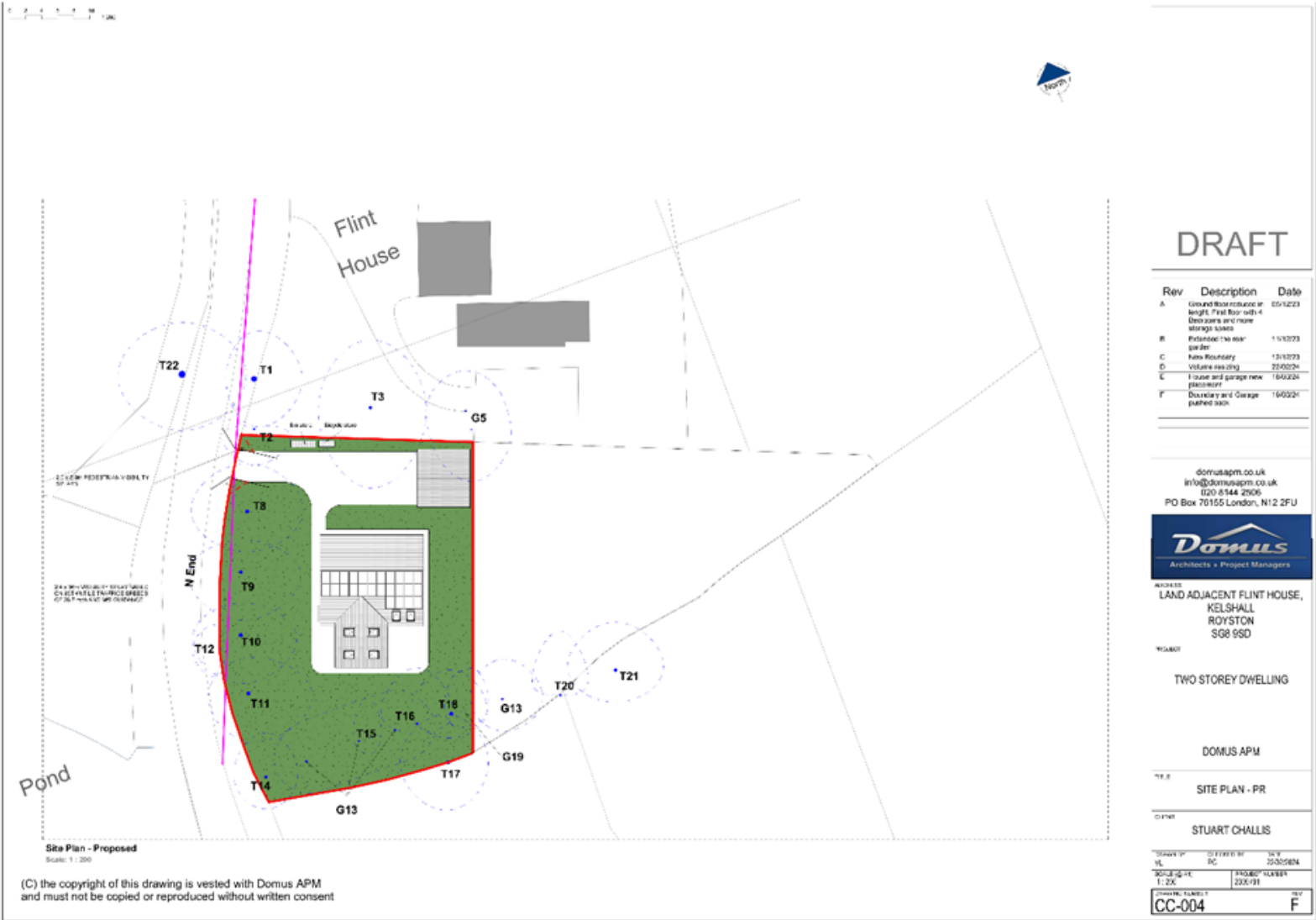
Appendix E: Site Photographs

Appendix F: Biodiversity Net Gain Relevant Policies

Appendix G: Bat and Artificial Light

Appendix A: Site Plans

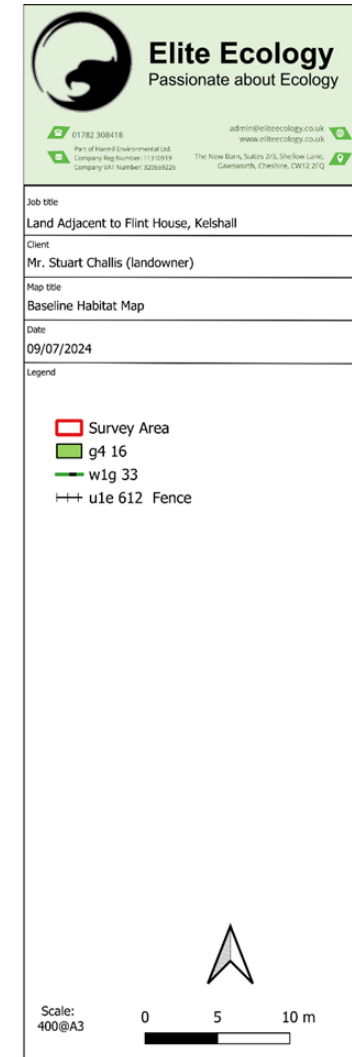
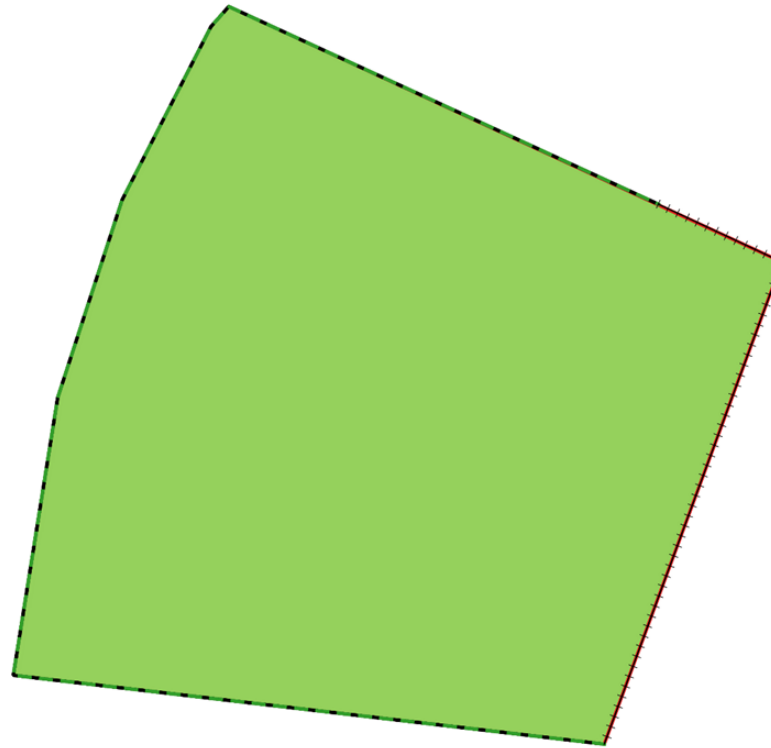




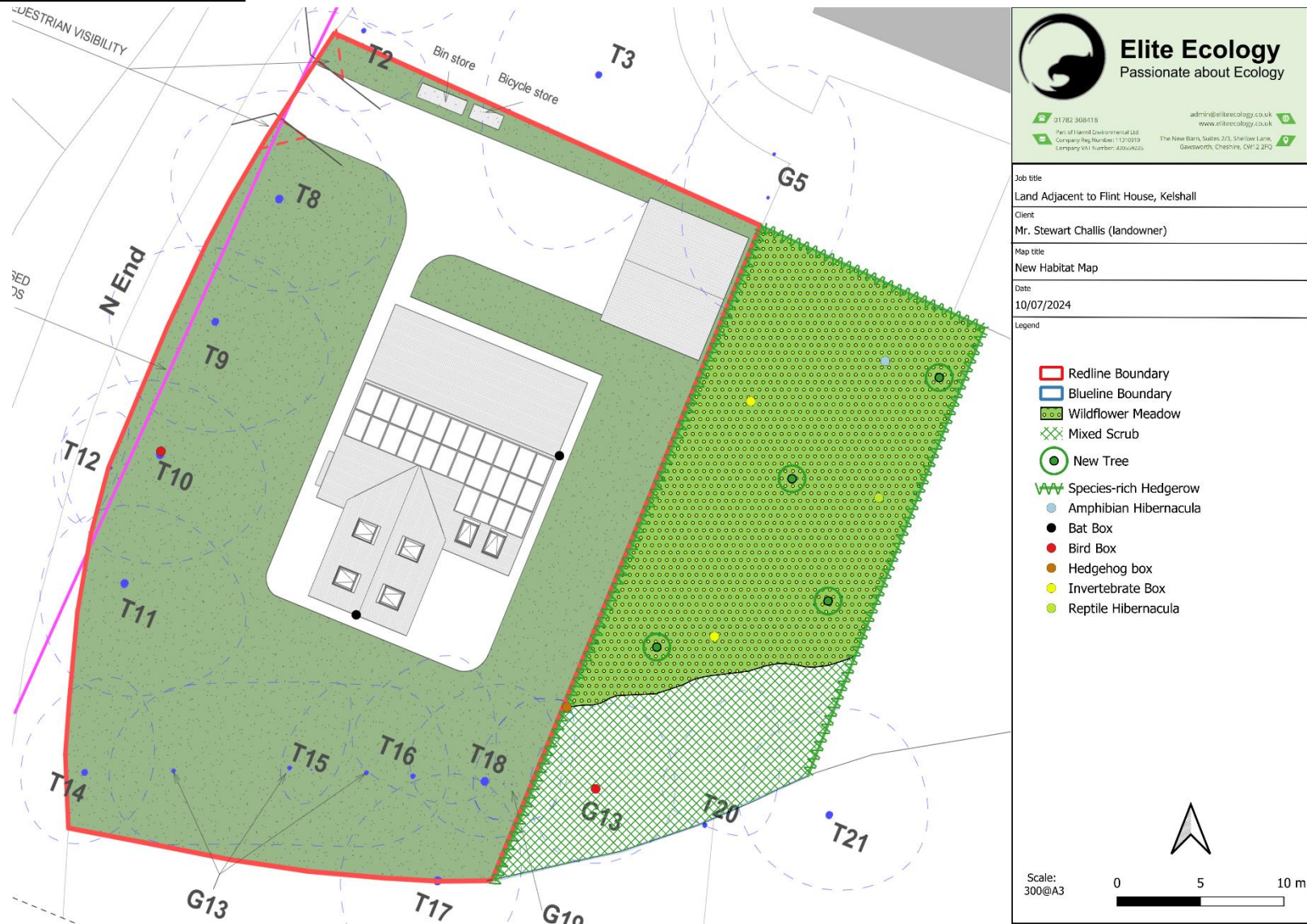
Appendix B: Habitat Condition Assessment Sheets

Habitat: Line of trees			
Condition Assessment Criteria			Criterion Passed
A	At least 70% of trees are native species.		Yes
B	Tree canopy is predominantly continuous with gaps in canopy cover making up <10% of total area and no individual gap being >5 m wide.		Yes
C	One or more trees has veteran features and or natural ecological niches for vertebrates and invertebrates, such as presence of standing and attached deadwood, cavities, ivy or loose bark.		No
D	There is an undisturbed naturally-vegetated strip of at least 6 m on both sides to protect the line of trees from farming and other human activities (excluding grazing). Where veteran trees are present, root protection areas should follow standing advice.		No
E	At least 95% of the trees are in a healthy condition (deadwood or veteran features valuable for wildlife are excluded from this). There is little or no evidence of an adverse impact on tree health by damage from livestock or wild animals, pests or diseases, or human activity.		No
Condition	Poor	Score	4/5

Habitat: Modified Grassland			
Condition Assessment Criteria			Criterion Passed
A	There are 6-8 vascular plant species per m2 present, including at least 2 forbs Note - this criterion is essential for achieving Moderate or Good condition.		No
B	Sward height is varied (at least 20% of the sward is less than 7 cm and at least 20% is more than 7 cm) creating microclimates which provide opportunities for vertebrates and invertebrates to live and breed.		Yes
C	Any scrub present accounts for less than 20% of the total grassland area. (Some scattered scrub such as bramble <i>Rubus fruticosus</i> agg. may be present). Note - patches of scrub with continuous (more than 90%) cover should be classified as the relevant scrub habitat type.		Yes
D	Physical damage is evident in less than 5% of total grassland area. Examples of physical damage include excessive poaching, damage from machinery use or storage, erosion caused by high levels of access, or any other damaging management activities.		Yes
E	Cover of bare ground is between 1% and 10%, including localised areas (for example, a concentration of rabbit warrens).		Yes
F	Cover of bracken <i>Pteridium aquilinum</i> is less than 20%.		Yes
G	There is an absence of invasive non-native plant species (as listed on Schedule 9 of WCA).		Yes
Condition	Poor	Score	6/7 but fails criterion 1

Appendix C: Baseline Habitat Map

Appendix D: New Habitat Maps



Appendix E: Site Photographs

Plate 1: Image showing the modified grassland and line of trees



Plate 2: Image showing part of the mown section of the modified grassland, line of trees and fence



Plate 3: Image showing the modified grassland and line of trees



Plate 4: Image showing part of the mown section of the modified grassland, line of trees and fence

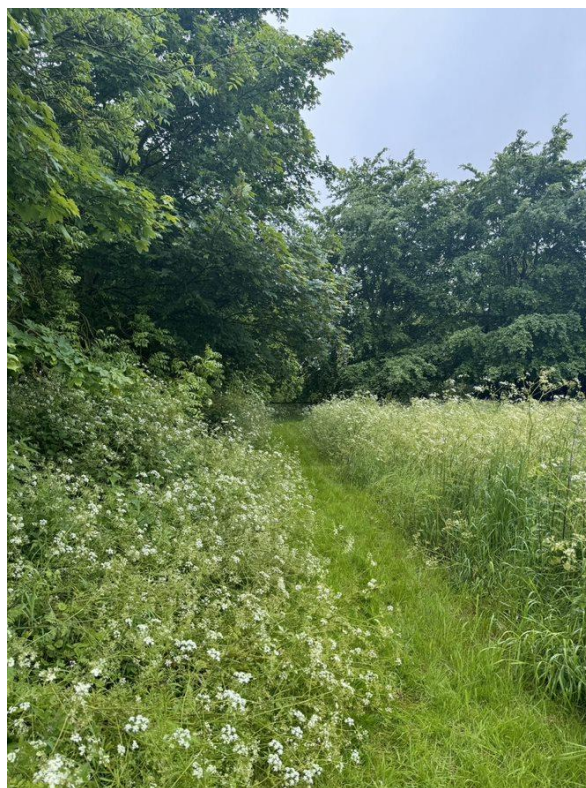


Plate 5: Image showing the modified grassland and line of trees



Appendix F: Biodiversity Net Gain Relevant Policies

Environmental Act 2021

Part 6 on nature and biodiversity covers all areas of biodiversity net gain across two core sections. This Act mandates that all planning meets a minimum of a 10% gain in biodiversity calculated using the appropriate Metric and that the newly created habitats are secured for at least 30 years.

National Planning Policy Framework (NPPF)

While currently not a legal obligation, biodiversity and environmental net gains are mentioned in the revised National Planning Policy Framework (NPPF) within the following paragraphs (please refer to the NPPF for the full quotations):

Achieving sustainable development

Paragraph 8 Section C. *“an environmental objective – **to protect and enhance our natural, built and historic environment**; including making effective use of land, **improving biodiversity**, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.”*

Preparing and reviewing plans

Paragraph 32. *“Local plans and spatial development strategies should be informed throughout their preparation by a sustainability appraisal that meets the relevant legal requirements. This **should demonstrate how the plan** has addressed relevant economic, social and **environmental objectives** (including **opportunities for net gains**). Significant **adverse impacts on these objectives should be avoided** and, wherever possible, alternative options which reduce or eliminate such impacts should be pursued. Where significant adverse impacts are unavoidable, suitable mitigation measures should be proposed (or, where this is not possible, compensatory measures should be considered).”*

Identifying land for homes

Paragraph 73 section C. *“consider the opportunities presented by existing or planned investment in infrastructure, the area’s economic potential and the scope for **net environmental gains**”*

Transport infrastructure:

Paragraph 104. *“Transport issues should be considered from the earliest stages of plan-making and development proposals, so that:
d) the environmental impacts of traffic and transport infrastructure can be identified assessed and taken into account – including appropriate opportunities for avoiding and mitigating any adverse effects, and for **net environmental gains**.*

Planning decisions:

Paragraph 119 *“Planning decisions and planning policy should a) encourage multiple benefits from both urban and rural land ... and taking opportunities to **achieve net environmental gains** - such as developments that would enable new habitat creation.”*

Conserving and enhancing the natural environment

Paragraph 174 Section D. “**minimising impacts on and providing net gains for biodiversity**, including by establishing coherent ecological networks that are more resilient to current and future pressures”

Habitats and biodiversity

Paragraph 179. “To protect and enhance biodiversity and geodiversity, plans should:

a) Identify, map and **safeguard components of local wildlife-rich habitats** and wider ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity; wildlife corridors and stepping stones that connect them; and areas identified by national and local partnerships for habitat management, **enhancement, restoration or creation**;

and b) promote **the conservation, restoration and enhancement of priority habitats**, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing **measurable net gains for biodiversity**.”

Paragraph 180. “When determining planning applications, local planning authorities should apply the following principles:

a) if **significant harm to biodiversity** resulting from a development **cannot be avoided** (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then **planning permission should be refused**;

b) development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest;

c) development resulting in the **loss or deterioration of irreplaceable habitats** (such as ancient woodland and ancient or veteran trees) **should be refused**, unless there are wholly exceptional reasons and a suitable compensation strategy exists;

and d) development **whose primary objective is to conserve or enhance biodiversity should be supported**; while opportunities to improve biodiversity in and around developments should be integrated as part of their design, especially where this can **secure measurable net gains for biodiversity** or enhance public access to nature where this is appropriate.”

Local Policy

Biodiversity is referenced multiple time with North Herts Local Plan 2011-2031.
A list and brief quotation can be found below:

Policy SP9: Design and Sustainability

The Council considers good design to be a key aspect of sustainable development. We will:

- a) Support new development where it is well designed and located and responds positively to its local context;
- b) Require Strategic Masterplans to be produced for Strategic Housing Sites and other significant development. Significant development generally comprises residential development of 100 dwellings or more. Exceptionally, developments under 100 dwellings will be considered significant if there are site specific complexities and sensitivities that require a masterplan-led approach. In some circumstances a Strategic Masterplan may also be required to consider the cumulative impact of more than one site to support a co-ordinated and integrated approach to place-making and design.
- c) Require Strategic Masterplans and planning applications for Strategic Housing Sites and significant development to (as applicable):
 - i. create buildings, spaces and streets which positively reflect and respond to the local landscape, townscape and historic character
 - ii. create integrated, accessible and sustainable transport systems with walking, cycling and public transport designed to be the most attractive forms of transport and effectively linking into the surrounding areas;
 - iii. provide a clear structure and hierarchy of pedestrian friendly streets and well-connected footpaths and cycleways integrate with the wider built and natural environment and communities;
 - iv. plan for integrated and mixed-use communities with walkable locally accessible community, employment and retail facilities;
 - v. positively integrate with adjacent rural and urban communities and positively contribute to their character and the way the area functions, including addressing cumulative, cross boundary planning and infrastructure matters;
 - vi. create and accessible multi-functional green infrastructure network that provides:
 - a key structuring and functional place-making feature supporting healthy lifestyles, sport, play and recreation linking into the wider Green Infrastructure Network; and
 - a high-quality integrated network to support ecological connectivity, biodiversity net gain, climate adaptation and mitigation linking into the wider Ecological Network

- vii. ensure the effective use of sustainable urban drainage and sustainable water management;
 - viii. ensure a hierarchy of linked, high quality and attractive public spaces and public realm that is safe, attractive and supports social interaction for all age groups; and
 - ix. design to last with a clear stewardship, management and maintenance strategy
- d) Ensure Strategic Masterplans are informed by a technical and design evidence base and include the following for Strategic Housing Sites and where applicable for other significant development:
- i. site specific vision and place-making principles
 - ii. Masterplan setting out the quantum, scale, type, mix and distribution of land uses, housing and community facilities;
 - iii. Green Infrastructure Framework identifying the scale, distribution, type and design of green spaces, biodiversity net gain, strategic drainage and on and off-site linkages:
 - iv. Movement Framework setting out the key access points, strategic highways, street hierarchy and footways and cycleways (on and off site)
 - v. Urban Design Framework and design principles identifying how the site responds to local character and context and key structuring elements and layout principles (including heights and densities)
 - vi. Sustainability & Energy Framework identifying site-wide and building scale opportunities for low and zero carbon
 - vii. Illustrative Masterplan Layout
 - viii. Infrastructure Delivery, Phasing & Management Strategy
- e) Encourage the submission of Strategic Masterplans for the Council's consideration and agreement before the submission of a planning application. We will also confirm the scope and contents of individual Strategic Masterplans with applicants in pre-application discussions. Planning applications must be accompanied by a Strategic Masterplan. Where applications have already been submitted to the Council a Strategic Masterplan should be agreed with the Council prior to or as part of the grant of planning permission. Adherence to the Strategic Masterplan will be secured through planning conditions and/or legal agreement.
- f) Assess proposals against detailed policy requirements set out in this Plan and have regard to the Design SPD; and
- g) Adopt the Government's additional technical standards for the size of new homes, water efficiency and, in specified circumstances, accessibility

Policy SP12: Green infrastructure, landscape and biodiversity

We will accommodate significant growth during the plan period whilst ensuring the natural environment is protected and enhanced. We will:

- a) Protect, identify, manage and where possible enhance a strategic multi-functional network of green infrastructure;
- b) Consider and respect landscape character, scenic beauty and locally sensitive features, particularly in relation to the Chilterns Area of Outstanding Natural Beauty;
- c) Protect, enhance and manage designated sites in accordance with the following hierarchy of designations and features:
 - Internationally designated sites
 - Nationally designated sites
 - Locally designated sites;
 - Non-designated sites that include important habitats and species
- d) Protect, enhance and manage biodiversity networks including wildlife corridors, ancient woodlands and hedgerows, wetland and riverine habitats, Local Geological Sites, protected species, priority species and habitats, and non-designated sites of ecological value and ensure measurable net gains for biodiversity; and
- e) Protect other open spaces and support provision of new and improved open space.

Policy NE4: Biodiversity and geological sites

Planning permission will only be granted for development proposals that appropriately protect, enhance and manage biodiversity in accordance with the hierarchy and status of designations and features listed in Policy SP12.

All development should deliver measurable net gains for biodiversity and geodiversity, contribute to ecological networks and the water environment, and/or restore degraded or isolated habitats where possible.

Applicants should, having regard to the status of any affected site(s) or feature(s):

- a) Submit an ecological survey that is commensurate to the scale and location of the development and the likely impact on biodiversity, the legal protection or other status of the site;
- b) Demonstrate that adverse effects can be avoided and / or satisfactorily minimised having regard to the hierarchy of protection below:
 - i. locating on an alternative site with a less harmful impact;
 - ii. providing adequate mitigation measures; or
 - iii. as a last resort compensated for.

The acceptability of approach(es) to avoidance, mitigation and compensation will be commensurate with the status of the asset(s) likely to be affected by the application; Compensation is unlikely to be an appropriate solution for proposals affecting nationally or internationally designated sites other than in the most exceptional circumstances.

- c) Include appropriate measures to manage construction impacts by demonstrating how existing wildlife habitats supporting protected or priority species will be retained, safeguarded and managed during construction;
- d) Integrate appropriate buffers of complimentary habitat for designated sites and other connective features, wildlife habitats, priority habitats and species into the ecological mitigation and design. The appropriateness of any buffers will be considered having regard to the status of the relevant habitat. 12 metres of complimentary habitat should be provided around wildlife sites be necessary to exceed this distance for fragile habitats such as ancient woodland or to provide appropriate root protection for mature trees; and
- e) Provide a long-term management and monitoring plan including mitigation measures as necessary.

Local Geological Sites are ratified by the Herts & Middlesex Wildlife Trust (HMWT) and are afforded the same protection as Local Wildlife Sites

Appendix G: Bats and Artificial Light

Artificial lighting is known to affect bat's roosting and foraging behaviour, with lighting resulting in a range of impacts that includes roost desertion (BCT, 2009), delayed emergence of roosting bats (Downs et al., 2003), increased activity of some bat species and decreased activity by others (Stone et al., 2012).

An experimental approach using LED units, demonstrated that relatively fast-flying bat species, including the common pipistrelle, showed no significant impacts as a result of new artificial lighting, even when lighting was set at relatively high levels close to 50 lux.

In contrast, slow flying bats such as the myotis bats (*Myotis* spp.) showed sharp reductions in presence, even at low light levels of 3.6 lux (Stone et al., 2012).

Current recommendations for all bat species specifies that no bat roost should be directly illuminated.

Due to the impacts of lighting, mitigation and sensitive lighting design schemes are required for projects where bats are present. These should include bat friendly lighting plans that should aim to avoid lighting wherever possible. If this is not possible, then the minimisation of any lighting impacts is required by adopting the following measures:

➤ **To introduce lighting curfews or use of PIR sensors.**

Lighting curfews can be an effective way of avoiding impacts on bats. These curfews may involve either turning off lighting or dimming light units at specific times of the night, dimming units at key times of the year, providing the luminaire allows for this option via a control unit. Lighting to be triggered by PIR sensors can be expected to be illuminated only when required and for a low proportion of time.

➤ **To consider no lighting solutions where possible.**

Options such as white lining, good signage and LED cat's eyes should be considered as preferable. Reflective fittings may help make use of headlights to provide any necessary illumination in some areas.

➤ **To use only high pressure sodium or warm white LED lamps where possible.**

High pressure sodium and warm white LED lamps emit lower proportions of insect attracting UV light than mercury, metal halide lamps and white LED lighting. Generally, lamps should have a lower proportion of white or blue wavelengths, with a colour temperature <4200 kelvin recommended (BCT, 2014).

➤ **To minimise the spread of light.**

The light spread should be kept at or near horizontal to ensure that only the task area is lit. Flat cut-off lanterns or accessories should be used to shield or direct light to where it is required. Baffles, hoods, louvres and shields should be used where necessary to reduce light spill.

➤ **To consider the height of the lighting column.**

While downward facing bollard lighting is often preferable, it should be noted that a lower mounting height does not automatically reduce impacts to bats as bollard lighting can often be designed to provide up-lighting. Where bollard lighting is considered to be the most appropriate system, bollard spacing or unit density should be kept to a minimum and units should be fitted with the appropriate hoods/deflectors to reduce any up-lighting.

➤ **To avoid reflective surfaces below lights.**

The polarisation of light by shiny surfaces attracts insects increasing bat activity (BCT, 2012). Consequently, surface materials around lighting require consideration.

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Elite Ecology agrees to supply ecological consulting services and advice of a preliminary or thorough nature as advised or commissioned. Upon commissioning Elite Ecology to undertake the work, the client(s) grant access to the site upon the agreed date. If no site access is available upon this date, Elite Ecology holds the right to charge the client(s) for lost staffing time and additional travel costs.

Elite Ecology undertake all site surveys with reasonable skill, care, and diligence, within the terms of the contract that has been agreed with the client and abiding by the Elite Ecology Terms and Conditions. The actions of the surveyors on site, and during the production of the report, were undertaken in accordance with the Code of Professional Conduct for the Chartered Institute of Ecology and Environmental Management.

The latest good practice guidelines put in place by Natural England or the relevant statutory conservation bodies have been followed by the surveyors on site. If those methodologies fail to identify a protected species during the survey efforts, no responsibility can be attributed to Elite Ecology. If any of these guidelines are adapted between the date(s) of the surveys being undertaken and the submission of this report, then Elite Ecology takes no responsibility for this.

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The survey results purport the current status of the site and its potential for protected species utilisation at the time of surveying. It should not be viewed as a complete list of the possible flora and fauna species that could be using the site at different times of the year.

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No reliance should be made on any such comments in relation to the structural integrity of the features located on the surveyed site. All information within the report is based solely on evidence that has been found on site during the service provided. No individual opinion or inference will be made other than that of the suitably qualified ecologist appointed to the project.