

Biodiversity Net Gain Assessment



Amethyst Lane, Reading

Principal Author: Amelia McCormack

Date: 16 May 2023

Project Code/ADAS Ref: 1051939/
MPT69105-824(00)

Version: 02

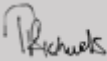
Address:

RSK ADAS Ltd
11D Park House,
Milton Park,
Abingdon,
OX14 4RS.

Commissioned For:

Gleeds Cost Management Ltd
Vanbrugh House,
Hedge End,
Southampton,
Hampshire,
SO30 2AF.

Quality Assurance

Revision	Date	Author	Checked	Approved
01	14 February 2023	Rachel Richards BSc (Hons) 	Sebastian Phelan BSc (Hons) ACIEEM 	Emma Mundy BSc (Hons) MSc CEcol CEnv MCIEEM 
02	16 May 2023	Amelia McCormack BSc (Hons) MSc 	Sarah Thornton-Mills BSc (Hons) MSc MCIEEM 	Emma Mundy BSc (Hons) MSc CEcol CEnv MCIEEM 

The information which ADAS has prepared and provided is true and has been prepared and provided in accordance with the CIEEM's Code of Professional Conduct. We confirm that the opinions expressed are our true and professional bona fide opinions.

Disclaimer

RSK ADAS Ltd (ADAS) has prepared this report for the sole use of the client, showing reasonable skill and care, for the intended purposes as stated in the agreement under which this work was completed. The report may not be relied upon by any other party without the express agreement of the client and ADAS. No other warranty, expressed or implied, is made as to the professional advice included in this report.

Where any data supplied by the client or from other sources have been used, it has been assumed that the information is correct. No responsibility can be accepted by ADAS for inaccuracies in the data supplied by any other party. The conclusions and recommendations in this report are based on the assumption that all relevant information has been supplied by those bodies from whom it was requested.

No part of this report may be copied or duplicated without the express permission of ADAS and the party for whom it was prepared.

Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

This work has been undertaken in accordance with the quality management system of RSK ADAS Ltd.

Contents

Summary	1
1 Introduction	2
1.1 Background and Objectives.....	2
1.2 Objectives of the report.....	3
1.3 Structure of the Report	3
1.4 The Author.....	3
2 Legislation and Policy Background	5
2.1 National Planning Policy Framework.....	5
2.2 The Environment Act (2021)	5
2.3 Local Policy.....	5
3 Methods.....	7
3.1 Baseline Habitat Assessment	7
3.2 The Mitigation Hierarchy	7
3.3 Biodiversity Metric Calculation	7
3.4 Limitations.....	8
4 Proposed Development.....	9
5 Baseline Biodiversity Unit Assessment.....	10
5.1 On-site Baseline.....	10
5.2 Habitat Baseline Assessment	14
5.3 Trading Rules.....	16
6 Proposed Biodiversity Unit Assessment	17
6.1 Impacts of the Proposed Development.....	17
6.2 On-site Habitats	18
6.3 Assumptions.....	19

7	BNG Good Practice Principles for Development	22
7.1	<i>Consideration of the Mitigation Hierarchy</i>	23
8	Conclusion	24
9	Reference	25
	Appendix 1: Proposed Development.....	I
	Appendix 2: Baseline Condition Assessment Sheets	II
	Appendix 3: Proposed Habitat Map	III
	Appendix 4: Baseline Habitat Map.....	IV

Summary

A planning application is being sought for development at a 0.56 ha site at Amethyst Lane, Reading, Berkshire, by Gleeds Cost Management Ltd, on behalf of Reading Borough Council for residential development including a respite centre.

The Preliminary Ecological Appraisal and baseline condition assessment undertaken by ADAS in October 2022 and January 2023, respectively, identified existing habitats on site including three disused buildings and associated hard landscaping; and unmanaged areas of modified grassland, mixed and Bramble scrub, introduced shrubs, scattered urban trees throughout the site, native hedgerows with trees, and lines of trees. The Preliminary Ecological Appraisal also identified habitats suitable for and/or signs of activity of protected and priority species, including nesting birds, roosting, foraging and commuting bats, Badger and Hedgehog.

ADAS were therefore commissioned to undertake biodiversity net gain assessments of the proposed plans for the development at the site. Plans include complete demolition of the three existing buildings on site and construction of residential dwellings, including affordable housing, and a respite centre, with associated hard and soft landscaping.

Landscaping proposals include retention of half the linear features along the boundaries of the site, as well as two of the 24 of the existing urban trees on site. All other habitats will be cleared to accommodate for creation of buildings and hardstanding, with associated vegetated urban gardens and grass verges, as well as creation of a species-rich sensory garden comprising other neutral grassland and planting of native hedgerows. Forty-three urban trees will also be planted throughout the site.

The proposed development will result in a **net biodiversity area gain of 0.45 biodiversity units, which represents a 14.42% net gain in area habitats** and a **net biodiversity linear gain of 0.93 biodiversity units, which represents a 252.83% net gain in linear habitats**. This will meet the minimum target of 10% net gain and adhere to the Local Plan, as well as the additional tree planting planned within the site and local area.

However, the trading rules of the metric have not been satisfied, with the loss of scrub habitat on site. These habitats are of medium distinctiveness and need to be replaced with the same or better habitat on-site. Currently, within the site plans there is no replacement habitat of the same broad habitat or a habitat of higher distinctiveness. To meet the trading rules, it is recommended that areas of native mixed scrub totaling 0.03 ha are included to offset the loss of scrub during construction.

1 Introduction

1.1 Background and Objectives

This report has been commissioned by Gleeds Cost Management Ltd on behalf of Reading Borough Council to inform a planning application of ca. 0.56 ha land located off Amethyst Lane, Reading RG30 2EZ (central OS grid reference: SU 69488 72676), hereafter referred to as 'the site'. The proposed development includes construction of 21 residential dwellings and a respite facility on site.

Due to the nature of the proposed development, it is understood that a biodiversity net gain assessment of the proposed works is required, as per local and national policy. Biodiversity net gain occurs in development when the project leaves the natural environment in a better state than it was prior to the project. To achieve biodiversity net gain, the developer is required to ensure that wildlife habitats are created or enhanced. It requires the development to result in a demonstrable increase in habitat value to the baseline (how the site was prior to development). Biodiversity net gain should be demonstrated quantitatively.

To demonstrate biodiversity net gain, the value of the habitats is assessed using a recognised metric tool to calculate biodiversity units. The biodiversity losses or gains resulting from the development are then calculated by subtracting the baseline (pre-development) units from the post development units. The Biodiversity Metric 3.1 Calculation tool (Natural England, 2021a) has been used here to demonstrate biodiversity net gain in a quantitative manner.

The Biodiversity Net Gain Good Practice Principles for Development (CIEEM, CIRIA and IEMA, 2016) are a set of ten principles which have been produced to provide a framework that helps improve the UK's biodiversity by contributing towards strategic priorities to conserve and enhance nature while progressing with sustainable development. To demonstrate that biodiversity net gain has been achieved in a qualitative manner for a development it would need to be shown that the development meets these ten principles which have been listed below:

- *Apply the mitigation hierarchy*
- *Avoid losing biodiversity that cannot be offset by gains elsewhere*
- *Be inclusive and equitable*
- *Address risks*
- *Make a measurable net gain contribution*
- *Achieve the best outcomes for biodiversity*
- *Be additional*
- *Create a net gain legacy*
- *Optimise sustainability*

- *Be transparent*

1.2 Objectives of the report

The BNG assessment has been produced in accordance with the British Standard (BS) for Biodiversity – Code of practice for planning and development, BS42020:2013.

The objectives of this report are as follows:

1. *To identify the planning policy context relevant to BNG matters on the site.*
2. *To describe the baseline biodiversity value of the site based on the UK Habitat condition assessment.*
3. *To evaluate the proposed biodiversity of the site based on the agreed final landscape proposals.*
4. *To calculate the predicted change in the biodiversity unit value of the site post development and demonstrate the potential biodiversity net gain of the proposed development in a qualitative manner.*
5. *To assess if the proposed development meets the requirements of the trading rules and demonstrate how the proposed development does meet those requirements.*
6. *To demonstrate how the proposed development meets the ten principles set out in the 'Biodiversity Net Gain Good Practice Principles for Development' and has led with the mitigation hierarchy.*

1.3 Structure of the Report

The remainder of this report is structured in the following manner:

- *Section 2 Planning policy context. This describes the national, county and district level planning policy relevant to biodiversity net gain matters in relation to the proposed development.*
- *Section 3 Methods. Describes the methods used to undertake the Biodiversity Net Gain Assessment.*
- *Section 4 Proposed development. This section describes the proposed development.*
- *Section 5 Baseline Biodiversity Unit Assessment. This section describes the biodiversity baseline information, identifies key habitats, analyses the condition of the baseline habitats, and provides the findings of the baseline biodiversity units.*
- *Section 6 Proposed Biodiversity Unit Assessment. This analyses the effects of the proposed development on the baseline biodiversity units identified in section 5 and details the provision of biodiversity within the proposed development. This section will also assess the proposed development against the mitigation hierarchy and ten principles.*
- *Section 7 Conclusion. This final part of the report summarises the overall effects on biodiversity on the site and if the proposed development can achieve a net gain in biodiversity.*

1.4 The Author

This document has been prepared by Amelia McCormack BSc (Hons) MSc, an ADAS Assistant Ecological Consultant. Amelia McCormack is a professional member of Chartered Institute of Ecology and

Environmental Management (CIEEM) and holds a Masters degree in a course relating to ecological consultancy. ADAS is a Landscape Institute and CIEEM registered practice, and all work is prepared and reviewed internally by senior highly experienced Landscape Architects and Ecologists.

2 Legislation and Policy Background

2.1 National Planning Policy Framework

The government policy for England on biodiversity is covered under the National Planning Policy Framework (NPPF) (2021), which includes multiple mentions of the requirement for a measurable net gain (highlighted in the following extracts below):

- *Para 174d: ‘Planning policies and decisions should contribute to and enhance the natural and local environment by... minimising impacts on and improving **net gains** for biodiversity, including by establishing ecological networks that are more resilient to current and future pressures...’*
- *Para 179b: ‘To protect and enhance biodiversity and geodiversity, plans should... promote the conservation, restoration and re-creation 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.’*
- *Para 180d: ‘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.’*

2.2 The Environment Act (2021)

The Environment Act (2021) requires all development schemes in England to deliver a mandatory 10% biodiversity net gain to be maintained for a period of at least 30 years after the development has been completed. Schedule 14 makes provision for biodiversity gain to be a condition of planning permission in England. The concept seeks measurable improvements for biodiversity by creating or enhancing habitats in association with development. Part 6 on nature and biodiversity covers all areas of biodiversity net gain across two core sections and the supporting Schedule 14, particularly sections 9(3), 13(2), 14(2) and 15. Although the Environment Act 2021 is a part of UK law, its policies – with mandatory biodiversity net gain included – aren’t expected to be fully integrated until the year 2023 as it goes through a two-year transition period. Many local planning authorities, however, are already enforcing the new NPPF in line with detailed guidance from DEFRA and Natural England and are applying a 10% biodiversity net gain requirement on each new development proposal.

2.3 Local Policy

The Reading Borough Council Local Plan (adopted November 2019) makes provision for protecting biodiversity and the green network in Policy EN12, which states the following in relation to biodiversity net gain:

- *b) “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 the 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.*

In exceptional circumstances where the need for development clearly outweighs the need to protect the value of the site, and it is demonstrated that the impacts cannot be: 1) avoided; 2) mitigated; or 3) compensated for on-site; then the new development will provide off-site compensation to ensure that there is “no net loss” of biodiversity. Provision of off-site compensation shall be calculated in accordance with nationally or locally recognised guidance and metrics. It should not replace existing alternative habitats, and should be provided prior to development.”

3 Methods

3.1 Baseline Habitat Assessment

This assessment was carried out as a desk-based exercise, using the results of the UK Habitat condition assessment survey undertaken by ADAS Assistant Ecological Consultant Rachel Richards BSc (Hons) in January 2023, and based on the proposed landscape design drawing, shown in Appendix 1.

3.2 The Mitigation Hierarchy

The aim of the BNG assessment is to identify, predict and evaluate potential key effects arising from the proposed development and assess them against the mitigation hierarchy. The mitigation hierarchy requires that developers first take steps to avoid and then to minimise impacts on biodiversity. Only after these steps are taken should developers look to compensate for losses that cannot be avoided. Finally, if compensation within the development footprint is not possible or does not generate the most benefits for nature conservation, the losses should be offset elsewhere. The proposals have been developed in accordance with the British Standard for 'Process for designing and implementing Biodiversity Net Gain – Specification', BS8683:2021 to reduce risk to harm of biodiversity and maximise the potential gains on the site.

3.3 Biodiversity Metric Calculation

Biodiversity metrics (units) were calculated for the site using the “Biodiversity Metric 3.1 - Calculation Tool” and guidance available on the Natural England Website in February 2022 (Natural England 2021a, 2021b). The biodiversity metric spreadsheet is provided as an Excel file with this report.

The metric uses area and linear habitat features as a proxy measure for capturing the value and importance of biodiversity. It uses a calculation in MS Excel to allow for the importance of these features for nature: their size, ecological condition, distinctiveness and location. The metric enables assessments to be made of the baseline (pre-intervention) biodiversity value of a site in terms of 'biodiversity units' and calculates the projected post-development (post-intervention) biodiversity value. The metric can also be used to measure off-site biodiversity changes for a project or development and can be applied from the level of an individual field to, for example, an entire river catchment.

The calculator uses the following variable elements to determine biodiversity units, based on the information collected in the field:

Habitat type: The original survey was based on the UK Habitat (UKHabs) classification system (UK Habs, 2020).

Area (Hectares): The area has been measured based on the digitised proposed ground floor map using 'QGIS' Geographical Information System (GIS) software. Measurements have been rounded up or down to the nearest two decimal places to achieve a minimal mapping unit (MMU) of 0.01 ha. Mapping habitats at different times of year may lead to variation between where one habitat starts and another begins as there is potential overlap between habitats (the ecotone). The actual field mapping is based on both field survey and aerial imagery in order to achieve the best representation of the areas covered by each habitat identified onsite. The areas for the post development site were taken from a pdf version of the development plan in Appendix 1 (Drawing references: RBC-ALR_HTA-A_DR_0101_Proposed Site Plan-REV H (1).pdf and RBC-ALR_HTA-L_Illustrative Plan.pdf).

Condition: The condition is a means to measure the quality of a habitat based on a series of physical characteristics and typical species of a particular habitat type. In order to aid the process, the Biodiversity Metric 3.1 Technical Supplement (Natural England, 2021b), provides 'condition sheets.' Condition sheets provide a list of positive indicators for each habitat and dependent on how many positive indicators a particular habitat meets will equate to the relevant condition for that specific habitat. In order that this process can be followed, in relation to this calculation, the number of positive indicators that are met for each habitat type are presented in Appendix 2 for each habitat found onsite.

Strategic significance: This element is to assess the habitats on site in relation to the geographical location in which they are located. Information to determine the significance of a habitat within a specific landscape can be found in a variety of sources that include: local plans, local biodiversity and National Character Areas. The strategic significance is based on three categories which equate to a different score, which are as follows: High – 1.15; Medium – 1.1 and Low - 1.

3.4 Limitations

Measurements are based on a two-dimensional mapping and would assume the site is completely flat and therefore certain habitats may be greater in extent if they occur on a slope.

In the field the surveyor will have judged the approximate area of each of the habitat type and where appropriate use aerial imagery to assist with mapping of the habitats as accurately as possible. The Biodiversity Metric 3.1 is accurate to two decimal places; therefore, habitats are rounded up or down to the nearest whole value, with a MMU of 0.01 hectares.

The baseline condition assessment was conducted in January, which is sub-optimal time for vegetation identification and habitat survey, so where this limited assessment, a precautionary approach was taken, as per instructions on The Biodiversity Metric 3.1 Condition Assessment Sheets (Natural England, 2021c) so calculations provide details of maximum potential impacts to biodiversity to generate a conservative calculation of biodiversity net gain for the site.

4 Proposed Development

The proposed development includes the demolition of all three buildings currently on site to facilitate construction and associated hard and soft landscaping and infrastructure of 21 new residential dwellings within the northern, eastern and western sides of the site, as per the plans provided by the client in March 2023 (RBC-ALR_HTA-A_DR_0101_Proposed Site Plan-REV H (1).pdf; Appendix 1). Of the new houses, 30% will be affordable housing, and a respite centre will also be constructed on site.

Hard landscaping includes the creation of access road into the site from the east end of Amethyst Lane and through the centre of site to connect to Jenkins Close adjacent to the northwest of the site. Twenty-two hardstanding parking spaces will be also provided on site along the internal access road and at the south of the site, including two electric charging spaces and a minibus drop-off point at the south end of the site.

Soft landscaping includes private amenity grass lawns associated with the residential housing, with community green spaces in the centre and southwest of the site – which will be managed as a ‘sensory garden’. There will be 43 small and medium native trees planted throughout the site – primarily within grass verges and green spaces – and the existing trees along the north of the side of the site will be retained and managed as hedgerows.

The proposed habitat map, using UKHabs classification, is provided in Appendix 3.

The planning application is set to be submitted to the Local Planning Authority (Reading Borough Council) in May 2023.

5 Baseline Biodiversity Unit Assessment

5.1 On-site Baseline

The existing habitats and linear features assessed in this report are based on the information provided in the Preliminary Ecological Appraisal report (ADAS, 2022) and on the conditions assessment survey completed in January 2023.

Table 1 is a Translation Table to describe the habitats identified on site using Phase 1 habitat classification during the Preliminary Ecological Appraisal to UKHabs, as required for use for biodiversity net gain assessment.

Table 1: Phase 1 to UKHabs translation table

Phase 1 Habitat	UK Habitat Classification
Scrub	Mixed scrub
Scrub	Bramble scrub
Scattered broadleaved trees	Urban trees
Scattered broadleaved trees	Line of trees
Improved grassland	Modified grassland
Amenity grassland	Modified grassland
Ephemeral/short perennial	Modified grassland
Introduced shrub	Introduced shrub
Introduced shrub	Mixed scrub
Species-poor hedgerow with trees	Native hedgerow with trees
Building	Sealed developed surface
Hardstanding	Sealed developed surface

The baseline habitat map is provided in Appendix 4, and Section 5.1.1 below describes the existing baseline habitats on site.

5.1.1 Habitats

5.1.1.1 Mixed scrub

There was a small patch of mixed scrub located along the northeast border of the site and ca. 0.001 ha comprising dominant Field Elm (*Ulmus minor*) and Hawthorn (*Crataegus monogyna*). The ground flora consisted of Yarrow (*Achillea millefolium*), Creeping Cinquefoil (*Potentilla reptans*), Ribwort Plantain (*Plantago lanceolata*) and Sweet Violet (*Viola odorata*).

5.1.1.2 Bramble scrub

There was an area ca. 0.003 ha of Bramble (*Rubus fruticosus* agg.) scrub at the northwest boundary of the site, which was encroaching onto an area of modified grassland.

Additionally, there was another patch of Bramble scrub (ca. 0.002 ha) to the south of Building 3.

5.1.1.3 Urban trees

There were at least 24 urban trees scattered throughout the site. Within the northeast corner there was a small section of broadleaved plantation woodland (ca. 0.001 ha). The mature trees were part of ornamental planting however, with the lack of management on the site, younger trees had self-sown and the canopy area had become very dense cutting off light to the ground flora. The dominant tree species was Norway Maple (*Acer platanoides*) with occasional Field Elm. The ground flora was dominated by Common Ivy (*Hedera helix*) with Sweet Violet appearing frequently.

There were also predominantly mature trees with occasional semi-mature trees and saplings throughout the rest of the site. The dominant species within the site was Norway Maple with frequent Sycamore (*Acer pseudoplatanus*), Hawthorn and Ash (*Fraxinus excelsior*). Found occasionally throughout the site were Wild Cherry (*Prunus avium*), Pedunculate Oak (*Quercus robur*), Sweet Chestnut (*Castanea sativa*), Crab Apple (*Malus sylvestris*), Silver Birch (*Betula pendula*), willow (*Salix* sp.) and False Acacia (*Robinia pseudoacacia*).

5.1.1.4 Line of trees

There were two lines of trees along the eastern boundary of the site, both approximately 0.02 km in length and of the same broadleaved species composition of the other urban trees found across the site.

5.1.1.5 Modified grassland

Within the northwest corner of the site was an area of modified grassland (ca. 0.01 ha) comprising dominant Perennial Rye-grass (*Lolium perenne*), Yorkshire Fog (*Holcus lanatus*) and False Oat-grass (*Arrhenatherum elatius*). Species such as Common Mallow (*Malva sylvestris*), Sun Spurge (*Euphorbia helioscopia*), Yarrow, Creeping Cinquefoil and Creeping Thistle (*Cirsium arvense*) were found frequently through this habitat. There were also patches of Common Ivy and Pedunculate Oak saplings along the north boundary of the site.

There were also a further six areas of modified amenity grassland across the site all associated with the building on site with a total area of 0.14 ha. All the areas had been unmanaged for some time but had not transitioned into other more naturalised habitats. All these areas had the same composition with Perennial Rye-grass as the dominant species. Cow Parsley (*Anthriscus sylvestris*), Creeping Buttercup (*Ranunculus repens*), Yarrow, Ribwort Plantain and dandelion (*Taraxacum* sp.) were also present within these grassland areas.

To the south of the site in front of the main gate was a spoil heap, which was covered in ephemeral vegetation (>0.001 ha). The dominant species found within this area included Colt's-foot (*Tussilago farfara*), Greater Plantain (*Plantago major*), Mugwort (*Artemisia vulgaris*) and dandelion. Creeping Buttercup, Green Alkanet (*Pentaglottis sempervirens*), Common Nettle (*Urtica dioica*) and Cleavers (*Galium aparine*) were also found frequently here.

5.1.1.6 Introduced shrub

The areas of introduced shrub on site were associated with the ornamental gardening around the buildings on site (ca. 0.03 ha). The three areas of shrub to the south of the site associated with Building 1 and 2 were dominated by Butterfly Bush (*Buddleja davidii*), which had become overgrown due to lack of management on site. Within the shrub running along the southeast wall of Building 2, species such as Cherry Laurel (*Prunus laurocerasus*), Mexican Orange Blossom (*Choisya ternate*) and Japanese Honeysuckle (*Lonicera japonica*) were also present.

The two small sections of shrub were located to the west of Building 3 (ca. 0.002 and 0.0006 ha). The smaller of the two areas contained bamboo (*Poaceae* sp.) and Hollyberry Cotoneaster (*Cotoneaster bullatus*) which were encroaching from neighbouring residential properties. The larger section was dominated by Butterfly Bush and firethorn (*Pyracantha* sp.). The largest area of shrub (ca. 0.01 ha) was part of the ornamental gardening along eastern wall of Building 3. This was dominated by Cherry Laurel and Mexican Orange Blossom.

5.1.1.7 Native hedgerow with trees

There were two sections of species-poor native hedge with trees, with one section along the north boundary (38 m) and the other running along part of the east boundary of the site (27 m). Both sections were overgrown due to lack of management. The smaller of the two sections contained Ivy and Hawthorn as the dominant species, with frequent Privet (*Ligustrum ovalifolium*). The trees within this section were Sycamore.

Along the north boundary, the trees were Sycamore and Pedunculate Oak. The dominant species within the hedge was Ivy with frequent Common Holly (*Ilex aquifolium*) and Dog Rose (*Rosa canina*). There were also rare appearances of Hollyberry Cotoneaster.

5.1.1.8 *Sealed developed surface*

There were three main buildings within the site boundary and three structures / outbuildings. Building 1 (0.007 ha) was a two-storey red brick building with a tile roof and wooden soffit, the building was in poor condition. All windows were boarded up with wooded boards. Common Ivy covered a large section of the west and southern aspect of this building.

Building 2 was a single-storey building in good condition (0.038 ha). The roof on the main section of the building was slightly pitched with the abutments each having flat roofs. Both roof sections were covered with bitumen. There was a roof void between the roof and the panel ceiling tiles within the building which could be viewed due to damaged tiles inside, however it was not possible to access the roof void.

Building 3 was a single-storey brick and mortar building in good condition with a tall, pitched roof within the central section of the building (0.120 ha). The outer sections had a slight pitch to the roof and was covered in bitumen. Internal access was granted to this building however no access to the roof void was possible.

Outbuilding 1 was a small, corrugated shed with a wooden door which was 0.0004 ha. This was located in the northwest of the site behind Building 3.

Outbuilding 2 was a large wooden shed (0.002 ha) that was in poor condition and had been predominantly covered with Common Ivy.

Outbuilding 3 was a large metal shipping container (0.001 ha) placed within the trees in the northeast section of the site.

There was also ca. 0.12 ha of hardstanding tarmacked ground surface throughout the site.

5.1.2 *Important ecological features*

5.1.2.1 *Designated sites*

There were six statutory designated sites within 5 km of the site and nine non-statutory designated sites within 2 km. The closest designated site was Prospect Park Local Wildlife Site approximately 0.68 km west of the site, which comprised public open parkland consisting of modified grassland and urban trees.

Due to the location, scale and nature of habitats and proposed works on site, and distance from other designated sites, it is unlikely there will be any significant impacts on designated sites from the proposed works.

5.1.2.2 *Priority habitats*

There were no Priority Habitats, as described under Section 41 of the Natural Environment and Rural Communities Act 2006, identified on site at the time of assessment.

5.1.2.3 Protected and priority species

The existing habitats on site were deemed suitable for various protected animal species during the Preliminary Ecological Appraisal, including nesting birds, roosting, foraging and commuting bats, Badger (*Meles meles*) and Hedgehogs (*Erinaceus europaeus*).

Evidence of roosting bats in Building 3 was recorded during the Preliminary Roost Assessment, with Building 1 deemed to be of 'high' suitability and Building 2 of 'moderate' suitability for roosting bats; and all buildings on site had evidence of or suitable features to support nesting birds, in addition to the hedgerows, scrub and trees. Bats and nesting birds are protected under the Wildlife and Countryside Act 1981 (as amended).

There was evidence of Badger presence within the vegetation in the north of the site recorded during the Preliminary Ecological Appraisal, including a sett, latrines and various well-established runs across the north of the site. Badgers and their setts are protected under the Protection of badgers Act 1992.

The hedgerows, scrub and grasslands at the site also provided suitable habitat for Hedgehogs, which are a Priority Species under Section 41 of the Natural Environment and Rural Communities Act 2006.

5.2 Habitat Baseline Assessment

The condition of each habitat has been assessed against the relevant positive indicators. Summaries of the habitat units and linear units for each baseline habitat are provided in Tables 2 and 3 below. A full breakdown of the condition assessments is presented in Appendix 2.

For strategic significance, the following has been considered the most appropriate for each habitat:

- *Mixed and Bramble scrub – not associated within any local strategy in terms of ecology;*
- *Urban trees – provide opportunities for biodiversity and increase connectivity throughout the site and are considered to be related to a local strategy plan (Reading Borough Local Plan (118b));*
- *Modified grassland – not associated within any local strategy in terms of ecology;*
- *Introduced shrub – not associated within any local strategy in terms of ecology;*
- *Native hedgerow with trees – provide opportunities for biodiversity and increase connectivity throughout the site and is referred to in the local plan (Reading Borough Local Plan (118b)); and*
- *Sealed developed surface – not associated within any local strategy in terms of ecology.*

Table 2: Baseline assessment – on-site area habitats

Habitat type (Area Habitats)	Area (ha)	Condition	Strategic significance	Total habitat units
Mixed Scrub	0.03	Poor	Location ecologically desirable but not in Local Strategy	0.13
Bramble Scrub	0.01	Condition Assessment N/A	Location ecologically desirable but not in Local Strategy	0.04
Urban Tree	0.25	Moderate	Formally identified in local strategy	2.30
Modified Grassland	0.02	Poor	Formally identified in local strategy	0.05
Modified Grassland	0.04	Good	Formally identified in local strategy	0.28
Modified Grassland	0.07	Moderate	Formally identified in local strategy	0.32
Introduced Shrub	0.01	Condition Assessment N/A	Area/compensation not in local strategy/ no local strategy	0.02
Developed land; sealed surface	0.20	N/A – Other	Area/compensation not in local strategy/ no local strategy	0.00
Developed land; sealed surface	0.18	N/A – Other	Area/compensation not in local strategy/ no local strategy	0.00
Total	0.56	-	-	3.14

Table 3: Baseline assessment – on-site linear habitats

Habitat type (Linear Habitats)	Area (ha)	Condition	Strategic significance	Total habitat units
Line of Trees	0.02	Moderate	Formally identified in local strategy	0.09
Line of Trees	0.02	Moderate	Formally identified in local strategy	0.09
Native Hedgerow with trees	0.01	Poor	Formally identified in local strategy	0.05
Native Hedgerow with trees	0.03	Poor	Formally identified in local strategy	0.14

Habitat type (Linear Habitats)	Area (ha)	Condition	Strategic significance	Total habitat units
Total	0.08	-	-	0.37

5.3 Trading Rules

For habitat trading purposes the following is required for each baseline habitat:

- *Mixed scrub: Medium distinctiveness. Same broad habitat or higher distinctiveness habitat required.*
- *Bramble scrub: Medium distinctiveness. Same broad habitat or higher distinctiveness habitat required.*
- *Urban trees: Medium distinctiveness: Same broad habitat or higher distinctiveness habitat required.*
- *Modified grassland: Low distinctiveness. Same distinctiveness or better habitat required.*
- *Introduced shrub: Low distinctiveness. Same distinctiveness or better habitat required.*
- *Developed land; sealed surface: Very low distinctiveness. Compensation not required.*
- *Line of trees: Low distinctiveness. Same distinctiveness or better required.*
- *Native hedgerow with trees: Medium distinctiveness. Same habitat or better required.*

6 Proposed Biodiversity Unit Assessment

6.1 Impacts of the Proposed Development

The proposals for new area habitats are based on the development plan in Appendix 3 and summarised in Table 4. The table provides details on habitats that will be created including the buildings, areas of hardstanding associated with the development and community spaces.

The majority of existing habitats on site will be lost with the proposed development and replaced with other habitats created. This includes the complete demolition of existing buildings on site to facilitate construction of the new buildings. The only areas of habitat to be retained are two medium urban trees in the west and east corners of the site of moderate condition. Therefore, in total ca. 0.81 ha of the 0.88 ha combined habitat areas (including urban trees) will be lost.

Additionally, two of the four existing linear features on site will be lost completely with the proposed development (0.02 km line of trees and 0.01 km native hedgerow with trees), with the remaining line of trees being halved in length to 0.01 km; and the remaining native hedgerow with trees all retained. Therefore, only half of the existing total length of linear features on site (0.04 km) are being retained. However, 0.30 km of new native hedgerows will be created throughout the site, primarily hedgerows outside residential properties and hedgerow boundary around the respite centre.

The total area of proposed habitats to be created on site is ca. 0.83 ha (including urban trees), comprising ca. 0.38 ha total of hardstanding/developed surfaces, including buildings, solar panels, roads and other hard landscaping. Approximately 0.04 ha of total roof area across the buildings on site will be green roofs planted with sedums. There will also be total ca. 0.08 ha of vegetated urban gardens associated with the residential dwellings and respite centre, which would likely be monoculture turfed lawn and of little ecological significance.

The other green spaces will comprise ca. 0.01 ha modified grass verges, which are assumed to be of Poor condition due to realistic management and frequent public usage; as well as ca. 0.01 ha mixed scrub of Moderate condition under the trees in the eastern corner of the site; and ca. 0.04 ha other neutral grassland, which includes the sensory garden in the west of the site and community swale on verges along the eastern side of the road that will run through the centre of the site and verges at the east and west ends of the road in the north of the site. This habitat will be planted with species-rich wildflower meadow seed mix, and due to the usage of these areas, it is assumed that a moderate condition will be the highest condition that can be realistically maintained within the other neutral grassland areas.

There will be 43 new urban trees planted within the site, consisting of 40 small¹ and three medium² to give a total area of 0.27 ha. It is assumed the trees will be in moderate condition and reach proposed condition/size by 25 years post-development. The planting scheme for these trees includes a mixture of native species and RHS species beneficial for pollinators, such as Field maple (*Acer campestre*), Alder (*Alnus glutinosa*), Downy Birch (*Betula pubescens*), Judas tree (*Cercis siliquastrum*), Hawthorn (*Crataegus monogyna*), Rowan (*Sorbus aucuparia*), and other non-native/ornamental species.

6.2 On-site Habitats

The new on-site area habitats are based on the development plan in Appendix 1 and are summarised in Table 4 with new linear features summarised in Table 5.

Table 4: Summary of on-site habitat creation

Habitat type	Area (hectares)	Condition	Ecological connectivity	Strategic significance	Total habitat units
Other neutral grassland (swale and sensory garden)	0.04	Moderate	Low	Formally identified in local strategy	0.30
Modified grassland (verges)	0.01	Poor	Moderate	Formally identified in local strategy	0.02
Mixed scrub	0.01	Moderate	Low	Location ecologically desirable but not in Local Strategy	0.07
Urban Tree	0.27	Moderate	Moderate	Formally identified in local strategy	2.31
Other green roof	0.04	Condition Assessment N/A	Low	Area/compensation not in local strategy/ no local strategy	0.07
Vegetated garden	0.08	Condition Assessment N/A	Moderate	Formally identified in local strategy	0.17
Developed land; sealed surface	0.38	N/A - Other	N/A	Area/compensation not in local strategy/ no local strategy	0.00

¹ Small trees are those classed in the Biodiversity Metric User Guide as having a diameter at breast height between 7 and 30cm.

² Medium trees are those classed in the Biodiversity Metric User Guide as having a diameter at breast height between 30 and 90cm.

Habitat type	Area (hectares)	Condition	Ecological connectivity	Strategic significance	Total habitat units
Total	0.56	-	-	-	2.95

**The metric calculator does not include the area measurement for urban street trees in the total due to the overlap in habitats*

Table 5: Summary of on-site linear feature creation

Linear type	Length (km)	Condition	Ecological connectivity	Strategic significance	Total habitat units
Creation					
Native hedgerow	0.3	Moderate	Low	Formally identified in local strategy	1.11
Total	0.3	-	-	-	1.11

6.3 Assumptions

The following assumptions have been made when determining the likely condition achieved for each new relevant habitat created that qualifies for a condition assessment by the proposed development:

Other neutral grassland

Assumed to achieve moderate condition for grassland of medium distinctiveness, by passing criteria 1, 3, 4 and 5:

- *Habitat closely matches the UKHab definition for the grassland type (other neutral grassland), with indicator species present;*
- *Less than 5% cover of bare ground;*
- *Bracken is less than 20% and scrub less than 5%; and*
- *No non-native invasive species (as listed on Schedule 9 of the Wildlife and Countryside Act 1981) present.*

Modified grassland

Assumed to achieve poor condition for grassland of low distinctiveness, by passing criteria 3, 6 and 7:

- *Scrub accounts for less than 20% total grassland area;*

- *Cover of Bracken is less than 20%; and*
- *No invasive non-native species present.*

Mixed scrub

Assumed to achieve moderate condition for scrub habitats, by passing criteria 1, 3 and 4:

- *Habitat is representative of UKHab description with at least three woody species present;*
- *There is an absence of invasive non-native species; and*
- *The scrub has a well-developed edge with scattered scrub and tall grassland and/or herbs present.*

Urban trees

Assumed to achieve moderate condition for urban trees by 25 years post-development, by passing criteria 1 and/or 2, 4 and 6 (at least three criteria are required to achieve this condition):

- *Tree is native species;*
- *Continuous canopy (automatically passed for individual trees);*
- *Tree is kept healthy with over 75% expected canopy retained and no significant adverse effects from pruning; and*
- *More than 20% canopy is oversailing vegetation below.*

Native hedgerow

Assumed to achieve moderate condition for hedgerows by passing the following:

- *No gaps present at the base of hedges;*
- *No undesirable perennial vegetation (i.e. Cleavers, Common Nettle) present along base of hedgerow; and*
- *No invasive or non-native species present.*

The total biodiversity value of the onsite habitat areas prior to development was 3.14 units. Of these habitats, 0.07 ha of urban trees are expected to be retained and protected during the construction phase of the development, which equates to 0.64 biodiversity units retained. All other baseline habitat types will be lost during the construction phase of the development. Post-construction, 3.59 units from habitats of Very Low to Medium distinctiveness will be created on-site, however, trading rules will *not* be met for loss of area of scrub habitat on site, in comparison to that created.

Therefore, under the current scheme design, post-development habitats and their associated target conditions will achieve **a total net change of 0.45 biodiversity units, which represents a 14.42% net gain.**

The total biodiversity value of the onsite linear features prior to development was 0.37 units. Of these, half of the total length of hedgerows and lines of trees are expected to be retained and protected during the construction phase of the development, which equates to 0.19 biodiversity units retained.

Post-construction, it is anticipated that 0.30 km of native hedgerow will be created, **equal to 0.93 linear units**. This represents a **252.83% net gain**.

A screenshot of the headline results within the biodiversity metric is shown in Table 7 below.

Table 7: Summary of Biodiversity Metric 3.1 results

On-site baseline	<i>Habitat units</i>	3.14
	<i>Hedgerow units</i>	0.37
	<i>River units</i>	0.00
On-site post-intervention (including habitat retention, creation & enhancement)	<i>Habitat units</i>	3.59
	<i>Hedgerow units</i>	1.30
	<i>River units</i>	0.00
On-site net % change (including habitat retention, creation & enhancement)	<i>Habitat units</i>	14.42%
	<i>Hedgerow units</i>	252.83%
	<i>River units</i>	0.00%
Off-site baseline	<i>Habitat units</i>	0.00
	<i>Hedgerow units</i>	0.00
	<i>River units</i>	0.00
Off-site post-intervention (including habitat retention, creation & enhancement)	<i>Habitat units</i>	0.00
	<i>Hedgerow units</i>	0.00
	<i>River units</i>	0.00
Total net unit change (including all on-site & off-site habitat retention, creation & enhancement)	<i>Habitat units</i>	0.45
	<i>Hedgerow units</i>	0.93
	<i>River units</i>	0.00
Total on-site net % change plus off-site surplus (including all on-site & off-site habitat retention, creation & enhancement)	<i>Habitat units</i>	14.42%
	<i>Hedgerow units</i>	252.83%
	<i>River units</i>	0.00%
Trading rules Satisfied?	No - Check Trading Summary ▲	

7 BNG Good Practice Principles for Development

Table 8 below outlines the justification of how each of the BNG Principles has been applied as part of the biodiversity net gain assessment.

Table 8: Good practice principles and their consideration within the scheme

Good Practice Principle	Site Considerations
Apply the mitigation hierarchy	Refer to Section 6.1 for more information
Avoid losing biodiversity that cannot be offset elsewhere	There will be no significant impacts to designated sites or priority habitats, and habitats of ecological significance that will be lost on site (scrub, urban trees, modified grassland) are common and widespread within the local area.
Compensate / Offset	Additional planting of urban trees is recommended to achieve at least 10% net gain in biodiversity and compensate for habitat loss.
Be inclusive and equitable	Achieve net gain with the inclusion of a range of local and specialist stakeholders during design and implementation, where possible.
Address risk	Biodiversity Metric 3.1 has been used as a nationally recognised method to quantify biodiversity changes from the proposed development. Proposed retained and created habitats have been selected as a practical and achievable way of meeting biodiversity net gain targets and recreational usage of the site and offsite mitigation within the local area. A management plan will be produced to ensure biodiversity and environment targets for the development are actioned.
Make a measurable net gain contribution	Biodiversity Metric 3.1 has been used to quantify the net change in biodiversity achieved by the proposed development, and with the current plans, a 14.42% net gain in habitat units and 252.83% net gain in linear features will be achieved.
Be additional	The site is not currently under any existing obligation to create habitat, therefore the proposals for habitat creation are additional to what would be expected to occur without development.
Create a net gain legacy	Engaging in local stakeholders and production of a Conservation Covenant agreement to ensure biodiversity net gain is achieved within 30 years of development at the site and habitats managed long-term to achieve best possible biodiversity and ecological status.
Optimise sustainability	By achieving net gain from proposed recommendations for the site in relation to biodiversity and ecology, the development will optimise environmental sustainability alongside accomplishing housing targets within the local area.
Be transparent	The biodiversity net gain assessment of the site has been made using Biodiversity Metric 3.1, and this report will be delivered alongside the calculation sheet and supported drawings used in the calculations. The recommended biodiversity plans for the site have been made through constant consultation with the client and all metric choices have been fully explained and justified.

7.1 Consideration of the Mitigation Hierarchy

Table 9 below outlines how the mitigation hierarchy is being considered.

Table 9: Mitigation hierarchy

Hierarchy Step	Site Considerations
Avoid	The site is avoiding any significant impacts to designated sites, priority habitats or irreplaceable habitats. A total 0.07 ha of habitat area and 0.04 km of linear habitats will be retained and protected on site as they are incorporated into the proposed plans. These include medium distinctiveness habitats such as urban trees and native hedgerow with trees.
Minimise	Impacts to existing biodiversity will be minimised by undertaking thorough and accurate ecological assessments of the habitats and species present within the site and undertaking informed further actions to minimised impacts to ecologically significant habitats and protected species.
Compensate / Offset	Detailed habitat compensation measures have been identified using the Biodiversity Metric 3.1: habitats lost on site will be compensated for by creation of alternate ecologically distinct habitats, including species-rich neutral grassland and planting of at least 43 additional urban trees in total onsite.

8 Conclusion

A residential development and respite centre site is proposed on land just off Amethyst lane, Reading, to aid with achieving housing targets and affordable living provision within the local area. This will lead to the which will lead to loss of hardstanding, scrub and modified grassland on site, but a gain of habitats that includes species-rich neutral grassland, as well as the retention of some of the linear features, including native hedgerows with trees and lines of trees. The proposed development will also create additional native hedges and planting of new trees on site.

The proposed development will result in a **net biodiversity area gain of 0.45 biodiversity units, which represents an 14.42% net gain in area habitats** and a **net biodiversity linear gain of 0.93 biodiversity units, which represents a 252.83% net gain in linear habitats**. This will meet the minimum target of 10% net gain and adhere to Policy EN12, as well as the additional tree planting planned within the site and local area.

However, the some of the trading rules of the metric have not been satisfied, as the area lost of scrub habitat on site will not be sufficiently compensated for by the area of scrub habitat created on site post-development. These habitats are of medium distinctiveness and need to be replaced with the same or better habitat on-site. Currently, within the site plans there is no replacement habitat. To correct the error, it is recommended that within the landscape design plan areas of native mixed scrub are included to offset the loss of scrub during construction. The trading rules should be met before the designs can go to planning, though this is not yet mandatory with Metric 3.1 and the current designs have been prioritised to achieve local housing targets.

9 Reference

ADAS (2022) *Preliminary Ecological Appraisal: Amethyst Lane.*

CIEEM, CIRIA and IEMA (2016) *Biodiversity Net Gain: Good practice principles.*

Natural England (2021a) *The Biodiversity Metric 3.1: auditing and accounting for biodiversity: User guide.*

Natural England (2021b) *The Biodiversity Metric 3.1 User Guide – Technical Annex 2.*

Natural England (2021c) *The Biodiversity Metric 3.1: Auditing and accounting for biodiversity: Condition Assessment sheets.*

NPPF (2021) *National Planning Policy Framework: Biodiversity and Geological Conservation.* Department for Communities and Local Government, Norwich.

The British Standard Institute (2013) *BSI Standards Publication, Biodiversity — Code of practice for planning and development.*

UK HABS (2020) *The UK Habitat Classification: Habitat Definitions. Version 1.1.*