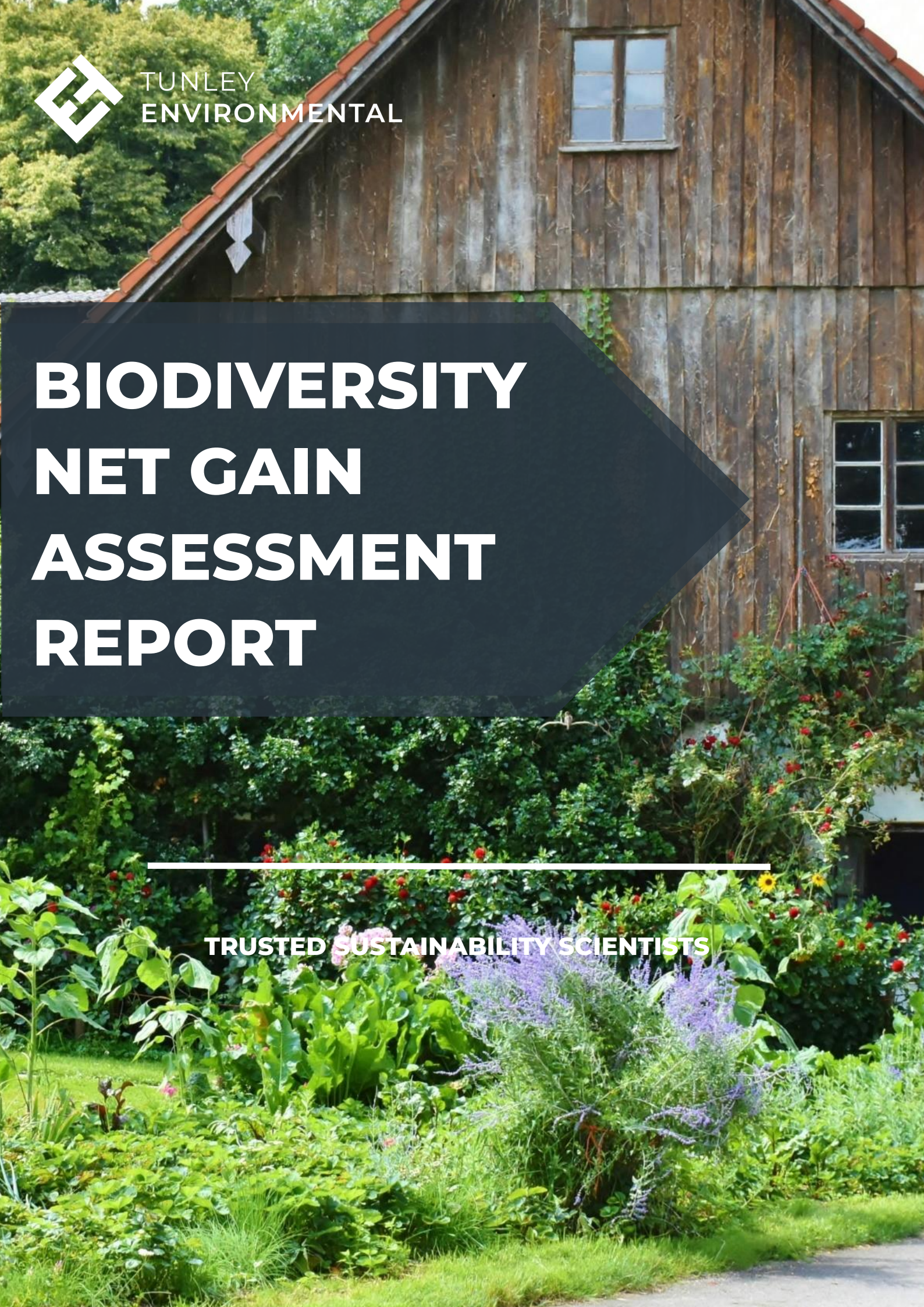


TUNLEY ENVIRONMENTAL

BIODIVERSITY NET GAIN ASSESSMENT REPORT

TRUSTED SUSTAINABILITY SCIENTISTS

BIODIVERSITY NET GAIN ASSESSMENT REPORT

FOR

Prospect House, Prospect Street, Cudworth, Barnsley, S72 8JS

in collaboration with

Lapworth Architects

TRUSTED SUSTAINABILITY SCIENTISTS | Copyright © 2024 Tunley Environmental

Contents

Nomenclature 3
Methodology and Quantification Standards 4
Executive Summary 5
Introduction 6
Baseline Results (Pre-development) 7
Biodiversity Net Gain Results 11
Off-site BNG units evidence 14
Conclusion 15
Appendix 16
- Data Sources 16
- Habitat Classification and Justification 16

Magic Map Results 16
Approval 17
- Details of Competency 17

IMPORTANT NOTICE: 18

TRUSTED SUSTAINABILITY SCIENTISTS | Copyright © 2024 Tunley Environmental

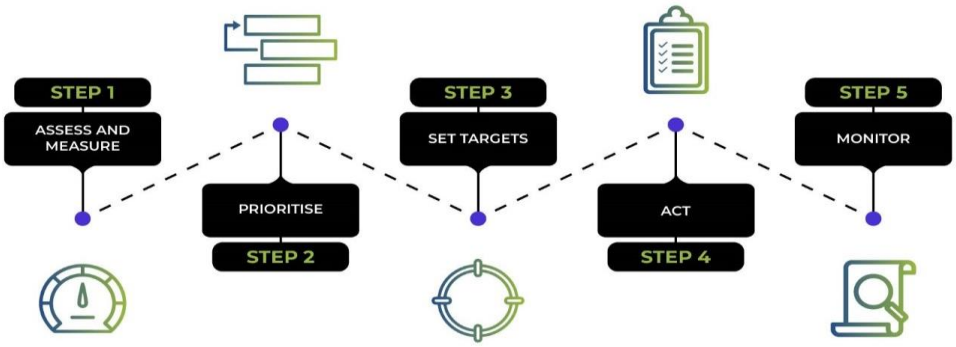
Nomenclature

Nomenclature	Description
Baseline Assessment	Before a development project begins, a baseline assessment is conducted to determine the existing biodiversity of the project site. This assessment establishes the current state of habitats, species, and ecosystem functions.
Biodiversity	The variety of life within a defined area for example, globally or in a specific habitat which can be described by a variety of metrics including species abundance or the living plant index and which we are dependent on to provide us with food, clean water and many more essentials.
Biodiversity Loss	The reduction in the variety and abundance of species in a particular ecosystem or across the entire planet. It can result from factors such as habitat destruction, pollution, climate change, and invasive species.
Biodiversity Net Gain	A concept that aims to ensure that development projects have a positive impact on biodiversity by enhancing or creating habitats.
Biodiversity Net Gain (BNG) Assessment	The quantification of the overall positive impact on biodiversity resulting from a specific activity or project. While biodiversity gain refers to the increase in the numbers, genetic variability, and species variety in a given area, BNG goes a step further by assessing whether the difference between biodiversity losses and gains leads to a net positive impact.
Biodiversity Units	A measure to describe the level of biodiversity present on a given site.
DEFRA Statutory (Official) Biodiversity Metric	Is a tool developed by the UK Government that provides a standardised approach to quantifying changes in biodiversity resulting from development activities. It assigns values to different habitats and species based on their ecological importance, and it allows for the calculation of a numerical score that reflects the overall biodiversity impact of a development.
Habitat	The specific environment or type of ecosystem in which a particular species of organism lives. Habitats can range from forests and wetlands to grasslands and urban areas.
Habitat Condition	The state or quality of a habitat, taking into consideration factors such as biodiversity, ecological processes, and overall health. Habitat condition assessment is essential in determining the effectiveness of conservation or restoration efforts.
Habitat Distinctiveness	The unique characteristics and features that differentiate one habitat from another. Distinctiveness is often assessed based on the diversity of species, ecological functions, and physical attributes of a habitat.
Habitat Strategic Significance	The local importance of a habitat determined by assessing both its geographic location and the specific type of habitat it represents. This evaluation helps in understanding the unique value and contribution of the habitat in its surrounding ecosystem.
On-Site	Refers to activities, impacts, or features that occur within the boundaries of a specific development or project site. In the context of Biodiversity Net Gain, on-site measures may include habitat creation, enhancement, or protection within the project area.
Off-Site	Relates to actions or effects that occur outside the boundaries of the development or project site. Off-site measures in Biodiversity Net Gain may involve compensatory actions, such as creating or enhancing habitats in a different location to offset any biodiversity loss caused by the development.
Small Site	A small residential site is a development which is less than 1 hectare with less than 9 dwellings, or where the number of dwellings is unknown an area of less than 0.5 hectares. A small commercial site is a development which has created floor space of less than 1,000 m^2 or with a total site area of less than 1 hectare.
Major Development	A major development is any development, either residential or non-residential, which falls out of the requirements of a small site. This means more than 9 dwellings or greater than 0.5 hectares for residential developments or greater than 1,000 m^2 floor space, or over a hectare for non-residential developments.

TRUSTED SUSTAINABILITY SCIENTISTS | Copyright © 2024 Tunley Environmental

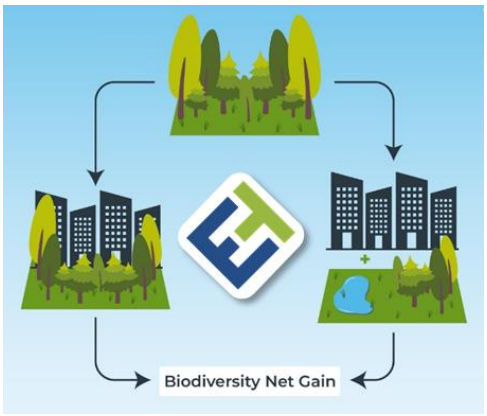
Methodology and Quantification Standards

This Biodiversity Net Gain (BNG) report has been completed using methodology consistent with the Science Based Targets for Nature (SBTN), Nature Positive Initiatives, and DEFRA Regulations.



Science-Based Targets for Nature Steps which Tunley Environmental's Biodiversity Net Gain (BNG) services aligns with to achieve reduced impact on Nature.

Biodiversity was quantified using the DEFRA (Department for Environment, Food & Rural Affairs) statutory (official) biodiversity metric as a tool to assess and measure biodiversity in the context of development projects. This metric is specifically designed to assist in quantification of the impact that development activities have on biodiversity and determine whether Biodiversity Net Gain (BNG) is achieved. Where BNG refers to the idea that the biodiversity value of a site should be enhanced due to development, ensuring a "net gain" in ecological terms. Tunley have completed all calculations within small site metric along with any required documents such as habitat condition. These additional documents will be submitted alongside this form in the excel format for LPA approval.



Tunley Environmental's conceptualisation of Biodiversity Net Gain.

Where applicable, the equivalent small site biodiversity metric was utilised for developments under the requirements for the statutory (official) biodiversity metric. The BNG assessment was further completed using methodology consistent with the international standard BS 8683:2021 (Process for designing and implementing BNG). Information on data sources and assumptions made to support this analysis are provided in Appendix A.

TRUSTED SUSTAINABILITY SCIENTISTS | Copyright © 2024 Tunley Environmental

Executive Summary

Biodiversity is the foundation of the global economy. The World Economic Forum (WEF) estimates that over 50% of the world's GDP, equivalent to 33 trillion pounds, significantly depends on nature and the services it provides. However, biodiversity is amid a severe global crisis. Human-induced changes in land and sea use, overexploitation, invasive species, pollution, and climate change are the primary drivers of rapid biodiversity decline. Human activity threatens approximately a million species with extinction, some within decades, and species are disappearing at a rate of tens to hundreds of times faster than the natural pace.

Biodiversity net gain is a concept implemented into the *Town and Country Planning Act 1990* that aims to ensure that development projects in the UK, specifically England, have a positive impact on biodiversity by enhancing or creating habitats either on-site or off-site.

The site at Prospect House, Prospect Street, Cudworth, Barnsley, S72 8JS is a predominantly Urban residential site, and has be analysed within the Defra Magic Map for proximity to priority habitats and designations, which are illustrated in the Magic map section of the Appendix. Tunley has calculated all analysis within the Statutory metric as the client will need to purchase offsite BNG credits to reach 10% net gain for area habitats.

Tunley Environmental have conducted an independent assessment to quantify the biodiversity value of the site before and after development to assess biodiversity of the site. Using data provided by Lapworth Architects the baseline 'area habitat' biodiversity units of the site were calculated to be 0.076 units over an area of 1764 m^2. This is comprised of developed land; sealed surface, vegetated garden, ground level planters, introduced shrub and ground based green wall. The baseline 'hedgerow habitat' biodiversity units of the site were calculated to be 0.19 units. This is comprised of native hedgerow and native hedgerow with trees.

Within the proposed development there are plans to create developed land; sealed surface and a native hedgerow. These initiatives will create 0.050 'area habitat' units and 0.21 'hedgerow habitat' units translating to a **-33.86% net loss in 'area habitats'** and **10.68% net gain in 'hedgerow habitat' units**.

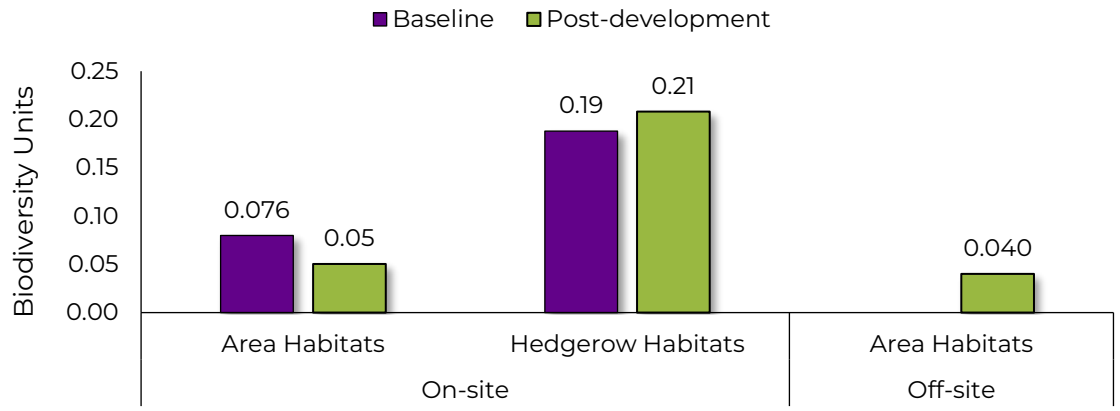


Figure 1. Total biodiversity units of the site, before and after development, including off site BNG unit purchased by Lapworth Architects.

TRUSTED SUSTAINABILITY SCIENTISTS | Copyright © 2024 Tunley Environmental

Introduction

Biodiversity is the foundation of the global economy. The World Economic Forum (WEF) estimates that over 50% of the world's GDP, equivalent to 33 trillion pounds, significantly depends on nature and the services it provides. However, biodiversity is amid a severe global crisis. Human-induced changes in land and sea use, overexploitation, invasive species, pollution, and climate change are the primary drivers of rapid biodiversity decline. Human activity threatens approximately a million species with extinction, some within decades, and species are disappearing at a rate of tens to hundreds of times faster than the natural pace. Between 1970 and 2016, populations of mammals, birds, amphibians, reptiles, and fish have, on average, decreased by 68%. Human activity has dramatically altered 75% of the land surface, significantly impacted 66% of the ocean, and led to the loss of 85% of wetlands.

Recognising the severity of this crisis, the integration of Biodiversity Net Gain (BNG) and ecosystem restoration emerges as a crucial strategy for mitigating the adverse effects of human activities on biodiversity. BNG aims to ensure that development projects not only avoid causing harm to ecosystems but actively contribute to a net positive impact on biodiversity. By implementing measures such as habitat creation, restoration, and protection, BNG seeks to counterbalance the negative ecological footprint of development.

The particular site in question, which is a single dwelling residential property with green spaces to the front, left and a back of the property. The plans propose the extension of the current residential dwelling on the green space at the front of the property. The site is situated in Barnsley Metropolitan Borough Council and have been asked to provide a Biodiversity Net Gain (BNG) assessment alongside the application.

Tunley Environmental has conducted an independent BNG assessment to identify and quantify the biodiversity of the site before and after the development. This BNG assessment calculates the biodiversity value of the land by evaluating the number of habitats present, the habitat types, size, condition, and location. These data inputs are utilised within the small site's statutory metric (due to the development size) to quantify the biodiversity units present before development. This is the baseline habitats and gives a value for baseline biodiversity units.

Below shows the most recent aerial image of the site at Prospect House (**Figure 2)**.

TRUSTED SUSTAINABILITY SCIENTISTS | Copyright © 2024 Tunley Environmental

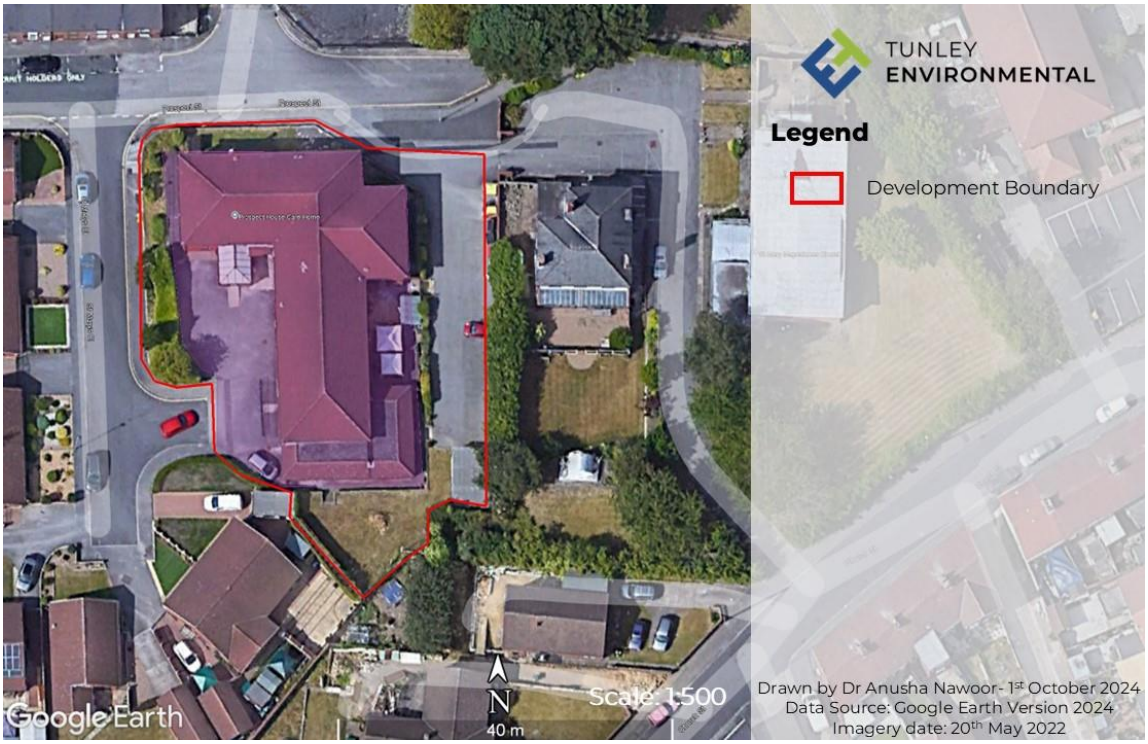


Figure 2. Aerial image of the site at Prospect House

Baseline Results (Pre-development)

Prior to analysing the biodiversity units post development we must conduct a baseline assessment on the site pre-development. This baseline assessment is conducted to determine the existing biodiversity on the project site. This assessment establishes the current state of habitats, species, and ecosystem functions.

The baseline assessment for the site at Prospect House was conducted by analysing site photos to distinguish habitat types as well as implementing Google Earth to accurately analyse site plans alongside dimensions to yield overall meters of the project site by habitat type. Some example images are shown in **Figure 3**.

TRUSTED SUSTAINABILITY SCIENTISTS | Copyright © 2024 Tunley Environmental



Figure 3. Example images provided to Tunley by Lapworth Architects of the site.

TRUSTED SUSTAINABILITY SCIENTISTS | Copyright © 2024 Tunley Environmental

A map of the habitats identified from these images is overlaid into the aerial image above in **Figure 4**.

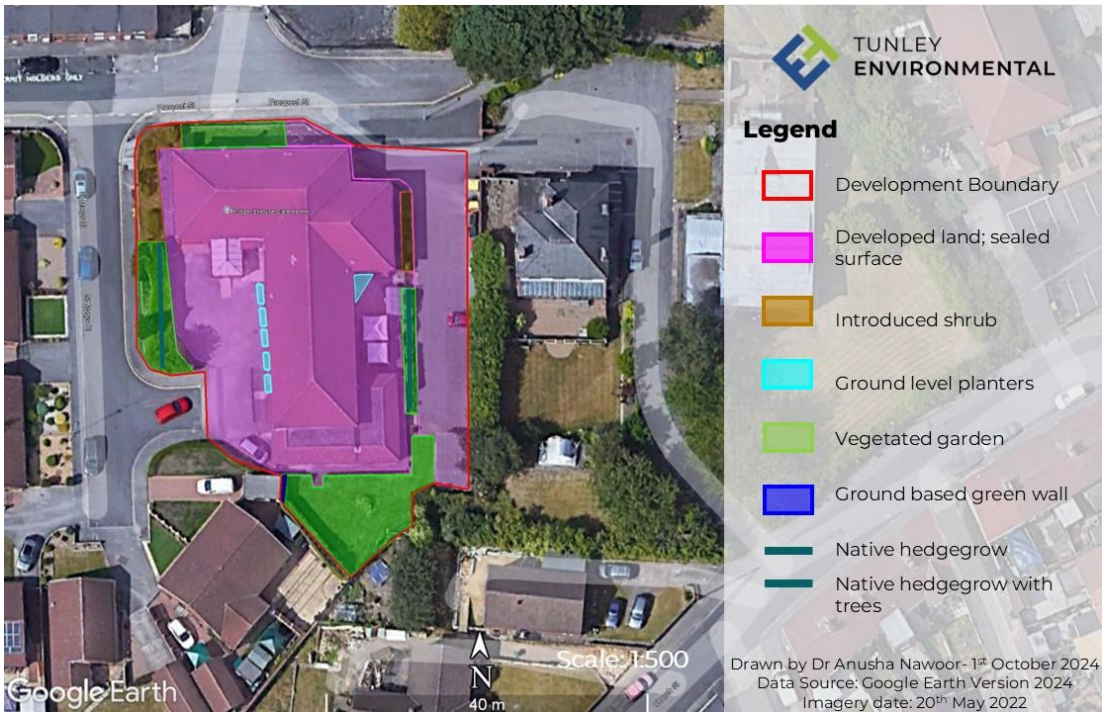


Figure 4. Aerial view separated by different habitat types identified on site pre-development.

For the proposed site for development, 'area habitats' and 'hedgerow habitats' biodiversity units were identified pre-development (**Figure 4** and **Table 1**). The UK habitat classification (UKHab) system is utilised to define habitats inputted within the metric. The different 'habitat types' identified on-site for this project included developed land; sealed surface, vegetated garden, ground level planters, introduced shrub and ground based green wall, with 1397 m2 of developed land; sealed surface contributing the greatest area.

TRUSTED SUSTAINABILITY SCIENTISTS | Copyright © 2024 Tunley Environmental

Table 1. Explanation of baseline habitat types, habitat characteristics, and habitat area/length.

Habitat Type	Habitat Characteristics	Habitat Area	Unit	Condition	Biodiversity Units	Retained Area	Lost Area
Developed land; sealed surface	Areas where the surface has been sealed by materials such as concrete, tarmac, or buildings.	1,397.00	m^2	N/A-Other	0.00	1,397.00	0.00
Ground level planters	Early successional habitats typically found on disturbed soils, often with a high cover of annual species.	15.00	m^2	Condition Assessment N/A	0.00	15.00	0.00
Vegetated garden	Gardens that support a variety of plants.	290.00	m^2	Condition Assessment N/A	0.050	161.00	129.00
Introduced shrub	Shrubs that have been planted and are not native to the area.	62.00	m^2	Condition Assessment N/A	0.010	62.00	0.00
Ground based green wall	Vertical structures covered with plants that are rooted in the ground.	7.00	m^2	Moderate	0.00	7.00	0.00
Native hedgerow	A hedgerow with >80% canopy cover of UK native or archaeophyte woody species, ≥20 m long with a woody component <5 m wide at its base, a shrub layer present and with ≥2 prominent trees taking their natural shape that are <20 m apart over most of its length.	15.00	m	Moderate	0.060	15.00	0.00
Native hedgerow with trees	A hedgerow with >80% canopy cover of UK native or archaeophyte woody species.	16.00	m	Moderate	0.13	16.00	0.00

TRUSTED SUSTAINABILITY SCIENTISTS | Copyright © 2024 Tunley Environmental

Biodiversity Net Gain Results

The site at Prospect House aims to consider biodiversity impact by implementing habitat enhancement and habitat creation to account for any biodiversity net loss due to construction, as well as to improve the site for the users of this site whilst still contributing to BNG goals.

The plan below (**Figure 5**) shows the proposed site landscape developed and designed by Lapworth Architects which retains 1635 m² of its 1764 m² area habitats and includes the design and implementation of developed land; sealed surface, and native hedgerow.

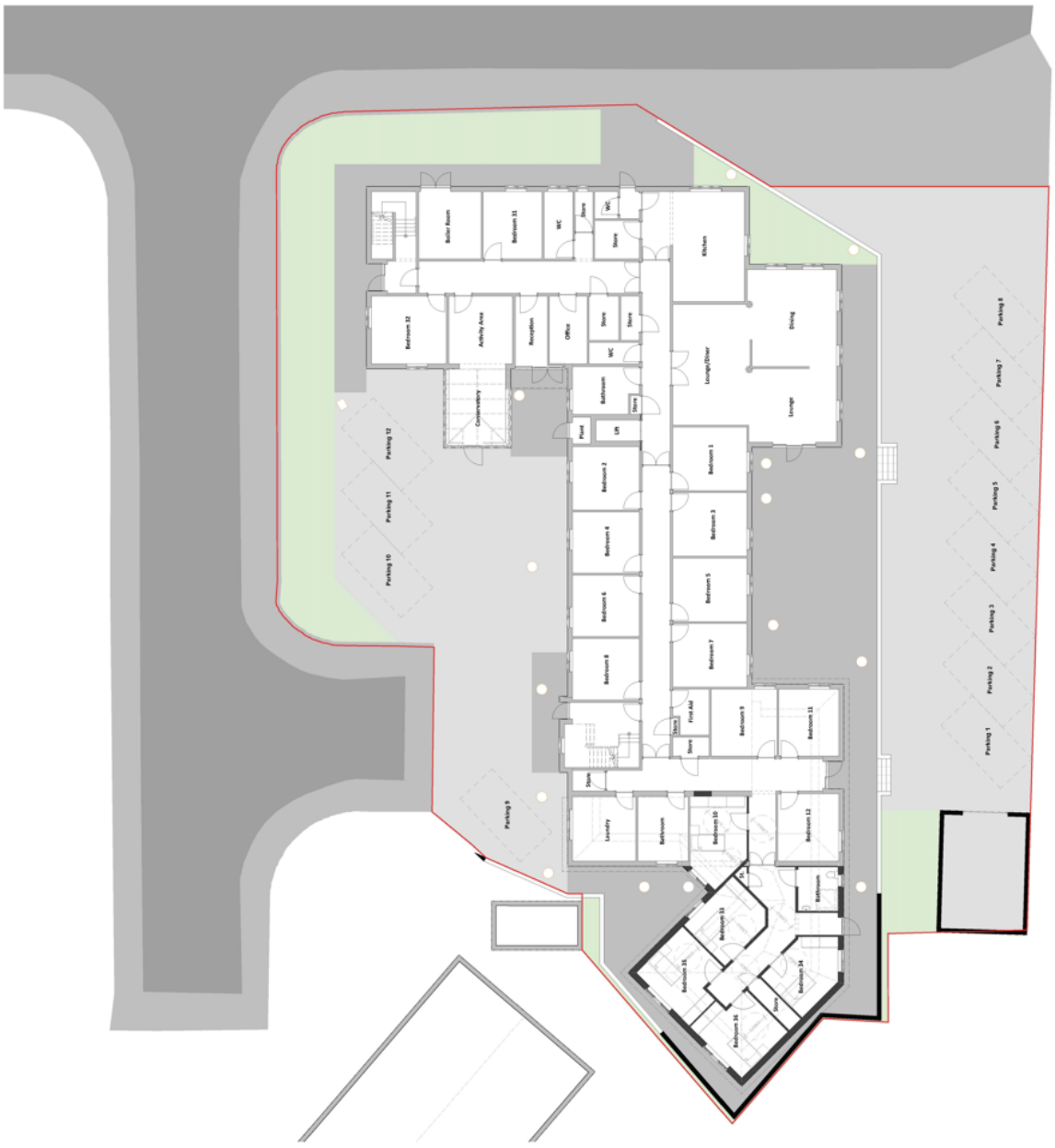


Figure 5. Proposed plan for the site at Prospect House with the extension at the front of the site.

TRUSTED SUSTAINABILITY SCIENTISTS | Copyright © 2024 Tunley Environmental

These changes in habitats were taken into account through the calculation of their areas, provided by Lapworth Architects and verified with an aerial view map, as seen in **Figure 6.**

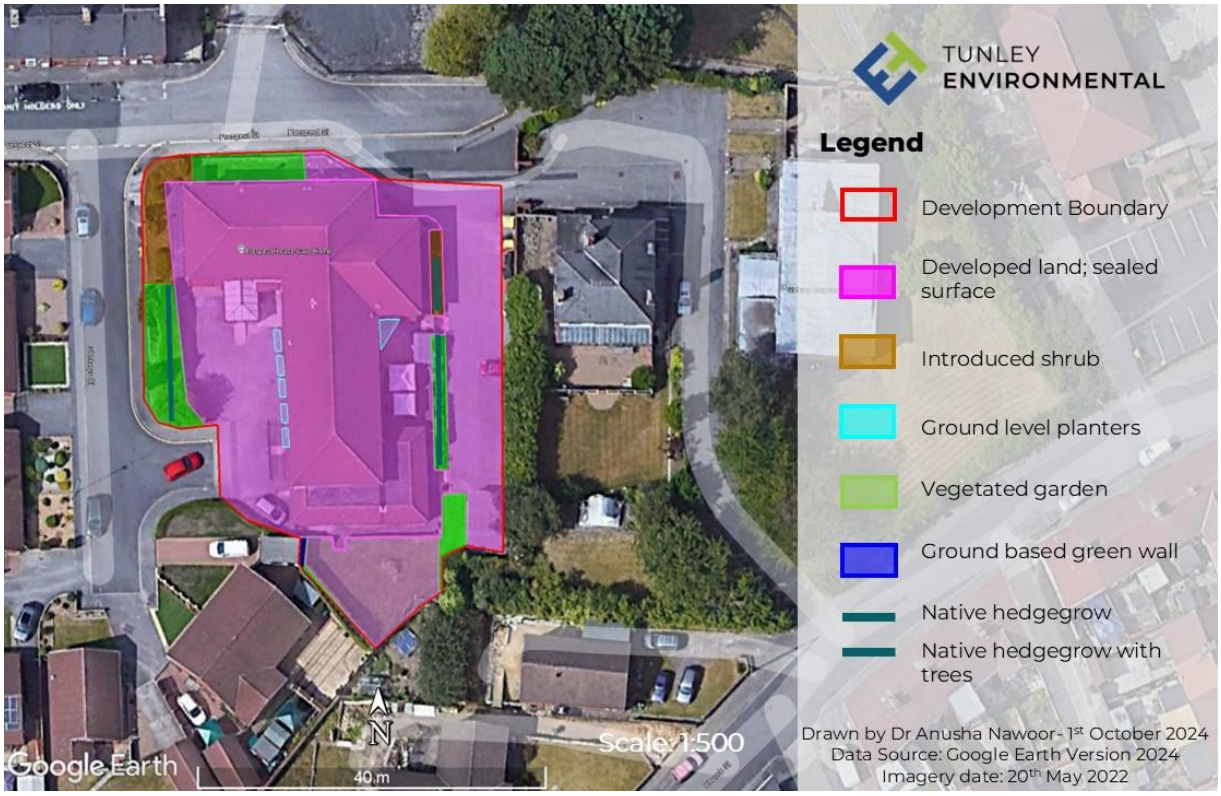


Figure 6. Aerial view of the site of post-development.

129 m² area of developed land; sealed surface replaces the vegetated garden due to the extension added on site (**Table 2**).

Table 2. Explanation of habitat type, habitat characteristics, and habitat area of all habitats to be created post-development.

Habitat Type	Habitat Characteristics	Habitat Area	Unit	Condition	Biodiversity Units
Developed land; sealed surface	Areas where the surface has been sealed by materials such as concrete, tarmac, or buildings.	129.00	m²	N/A - Other	0.00
Native hedgerow	A hedgerow with >20% canopy cover of UK non-native woody species.	6.00	m	Moderate	0.020

TRUSTED SUSTAINABILITY SCIENTISTS | Copyright © 2024 Tunley Environmental

The incorporation of these new habitats creates 0.020 biodiversity units, which brings the site to a total of 0.050 biodiversity units post-development, translating to -33.86% net loss in biodiversity for area habitats. (see **Table 3**).

Table 3. Detailed losses and gains of biodiversity 'area habitat' units resulting from development.

Description of modifications	Losses & Gains of Biodiversity units
Total on-site baseline biodiversity area habitat units	0.076
On-site retention of baseline biodiversity 'area habitat' units - 1397 m² of developed land; sealed surface in n/a - other condition - 161 m² of vegetated garden in condition assessment n/a condition - 62 m² of introduced shrub in condition assessment n/a condition - 15 m² of ground level planters in condition assessment n/a condition - 7 m² of ground based green wall in moderate condition	0.050
On-site loss of baseline biodiversity 'area habitat' units - 129 m² of vegetated garden in condition assessment n/a condition	-0.030
On-site creation of area habitats (all low strategic significance): - 129 m² of developed land; sealed surface in n/a - other condition	+0.00
On-site enhancement of area habitats (all low strategic significance):	+0.00
Total on-site post-development biodiversity 'habitat' units	0.050
Total net gain in biodiversity 'habitat' units	**-0.030**
Overall percentage net change in biodiversity 'habitat' units	**-33.86%**

Within 'hedges and lines of trees' habitats, 0.020 units are created in the development plans, which bring the site to a total of 0.21 biodiversity units post-development, translating to a 10.68% net gain in hedgerow biodiversity. These habitats therefore ensure that the 10% net gain target for biodiversity will be met (**Table 4**).

TRUSTED SUSTAINABILITY SCIENTISTS | Copyright © 2024 Tunley Environmental

Table 4. Detailed losses and gains of biodiversity 'hedges and lines of trees' units from development.

Description of modifications	Losses & Gains of Biodiversity units
Total on-site baseline biodiversity 'hedgerow' units	0.19
On-site retention of baseline biodiversity 'hedgerow' units - 15 m of native hedgerow in moderate condition - 16 m of native hedgerow with trees in moderate condition	0.19
On-site loss of baseline biodiversity 'hedgerow' units - None	-0.00
On-site creation of 'hedgerow' units - 6 m of non-native and ornamental hedgerow in poor condition	+0.020
On-site enhancement of 'hedgerow' units	+0.00
Total on-site post-development biodiversity 'hedgerow' units	0.21
Total net gain in biodiversity 'hedgerow' units	**+0.020**
Overall percentage net change in biodiversity 'hedgerow' units	**+10.68%**

Off-site BNG Units - Evidence

Lapworth Architects is committed to complying with BNG regulations. Whilst they are not able to reach onsite BNG for area habitats with a unit deficit of 0.030, they will purchase offsite area habitat units to reach 10% area habitat net gain. Evidence of BNG unit quote can be found in **Figure 7**.

Figure 7 Evidence of BNG Credits commitment from Lapworth Architects

Unit Type Impacted	Distinctiveness	Number of Units	Unit Type Provided	Distinctiveness	Habitat Bank	Delivery Proximity of Units Provided (Spatial Multiplier)	Environment Bank price +33.33% for adjacent delivery (exc. VAT)	Environment Bank total price per unit type (incl. spatial multiplier & exc. VAT)
Residual biodiversity loss	Low	0.03	Grassland	Medium	HARR11	Adjacent	£31,333.33	£940.00
	Subtotal	***0.03***						***£940.00***
Net gain target (10%)	N/A	0.01	Grassland	Medium	HARR11	Adjacent	£31,333.33	£313.33
	TOTAL	**0.04**						***£2,500***

Lapworth Architects will demonstrate BNG national compliance by purchasing 0.040 BNG credits. The BNG calculations provided by Tunley Environmental have been done in the Statutory Metric so the credit seller may provide the final details on the offsite units for LPA review.

TRUSTED SUSTAINABILITY SCIENTISTS | Copyright © 2024 Tunley Environmental

Conclusion

The BNG assessment by Tunley Environmental have confirmed the site Prospect House, Prospect Street, Cudworth, Barnsley, S72 8JS will reach the national standard of 10% biodiversity net gain by purchasing off site habitat area units to address the **0.030 biodiversity unit deficit** for 'habitats'. The site has reached the national standard for hedgerow biodiversity net gain by way of onsite habitat creation which resulted in **10.68% net gain** for 'hedges and lines of trees'.

BNG approaches offer a pathway to not only safeguard the intricate web of life on Earth but also to preserve the essential ecosystem services that underpin the global economy and human prosperity. As the urgency of addressing biodiversity loss intensifies, a comprehensive strategy that integrates conservation, sustainable development, and restoration efforts is essential to ensure a resilient and biodiverse future for the planet.

TRUSTED SUSTAINABILITY SCIENTISTS | Copyright © 2024 Tunley Environmental

Appendix

Data Sources

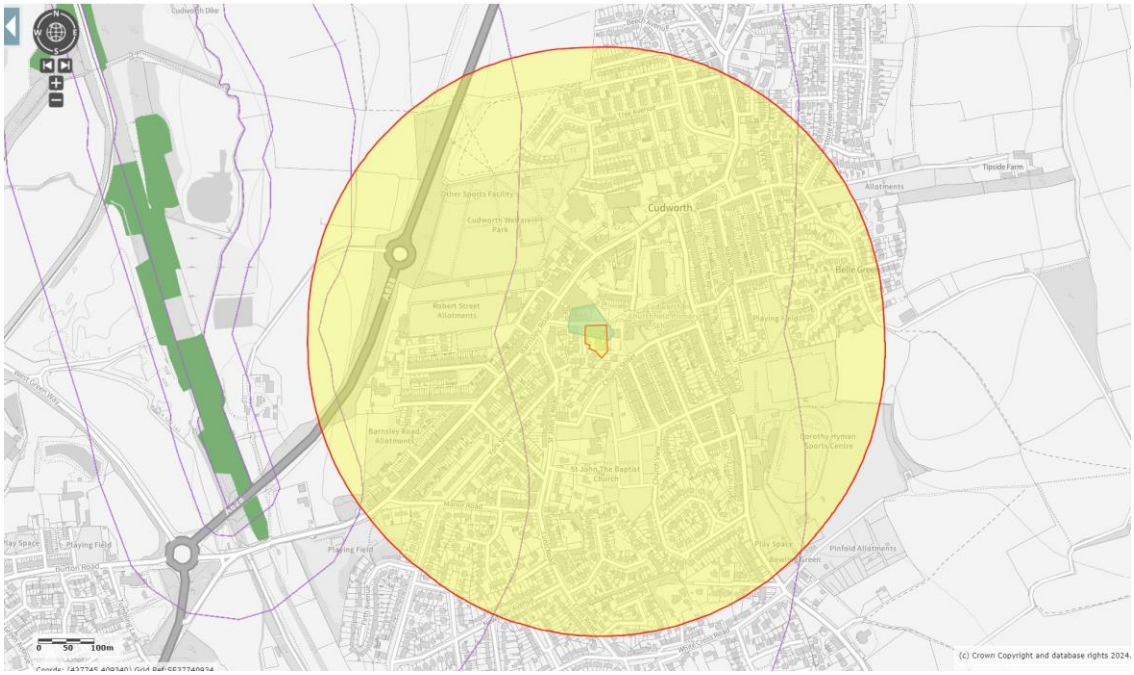
All data results were analysed through the small site metric from DEFRA. The excel version of the metric will also be submitted alongside this report for further evidence and LPA approval and for compliance with BNG regulations.

Habitat Classification and Justification

We conducted a thorough assessment of all habitat types utilising the guidelines outlined in "The UK Habitat Classification Version 2" (UKHab). UKHab serves as a comprehensive, hierarchical system that integrates seamlessly with existing classifications in the UK and Europe. It's architecture, inclusive of primary habitats and secondary codes, enhances the accuracy and consistency of habitat assessments by allowing for the direct attachment of additional features such as habitat mosaics and management strategies. This approach not only facilitates the integration of legacy datasets but also enables efficient sharing of habitat data at regional, national, and international levels. BNG Compliance adheres to these classifications, ensuring consistency and compliance with ecological standards. It's essential that a trained and certified ecologist completes the assessment. For more information, please visit: UKHab.

Magic Map Results

The development is being undertaken in an urban residential area, and is technically classed as a small site, thus the impacts on the overall priority habitats within 500 metres of the site will be minimal.



TRUSTED SUSTAINABILITY SCIENTISTS | Copyright © 2024 Tunley Environmental

Approval

Author:	Dr Anusha Nawoor, PhD
Position:	Environmental Scientist
Written Date:	3rd October 2024
Peer-reviewed by:	Dr Aaron Yeardley, MEng, AMIChemE
Position:	Science Team Co-Lead
Reviewed Date:	8th October 2024
QA approved by:	☒ Approved ☐ Revision: N/A Dr Luan Ho, MIEnvSc, BEng
Position:	Quality Assurance Manager
Approval date:	8th October 2024
Reference:	LapworthArchitects-BNG_24-2-A
Revision:	S

Revision History:	Change Description:	Changed by:	Date:	Approved by:	Date:
B					
C					
D					
E					
F					

Details of Competency

Dr Anusha Nawoor, BSc (hons), PhD, is an Environmental Scientist and a Biomedical Scientist holding two higher degrees in biomedical related subjects. Anusha has completed professional training with UKHab for habitat identification for Biodiversity Net Gain (BNG) assessments and has completed several hours of training through in-house procedures/training. She is committed to ongoing training to stay current with BNG standards and has advanced UKHab training planned for the near future. She is competent to conduct BNG assessments, provided the habitats are signed off by an ecologist.

TRUSTED SUSTAINABILITY SCIENTISTS | Copyright © 2024 Tunley Environmental

IMPORTANT NOTICE:

Tunley Environmental Ltd has prepared this report and any attachments, based on an agreed scope of work, and acts as an advisor to the named Client and exercises all reasonable skill and care in the provision of its professional services, in a manner consistent with the level of care and expertise exercised by consultants in a similar environment.

Reports are commissioned by and prepared for the exclusive use of the named Client. They are subject to and issued in accordance with the agreed terms between the Client and Tunley Environmental Ltd. Tunley Environmental Ltd is not responsible and will not be liable to any other person or organisation for, or in relation to any matter dealt within this Report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in this report (including without limitation), matters arising from any negligent act or omission of Tunley Environmental Ltd, or for any loss or damage suffered by any other party relying upon the matters dealt with or conclusions expressed in this Report.

This report is not intended to be a comprehensive review of the practices of the named recipient nor the viability of its products or services. It is the responsibility of the named recipient to ensure that all its products or services adhere to and are compliant with all applicable laws, regulations and other generally accepted standards of quality and performance. Tunley Environmental Ltd accepts no liability for any failure of the products or services to meet any such standards or for any loss or other damages, (including death or personal injury) caused as a result of any such failure.

When taking any action, Recipients should not rely solely upon the report or the accuracy or completeness of any conclusions and should make their own inquiries and if they are unsure, should obtain independent advice in relation to such matters.

Except where expressly stated, Tunley Environmental Ltd has not verified the validity, accuracy or comprehensiveness of any information supplied to it, used as the background information for the writing of this report. It is assumed that the information provided to Tunley Environmental Ltd was both complete and accurate.

Information contained in the Report is current as at the date of the Report and may not reflect any event or circumstances which occur after the date of the Report. Tunley Environmental Ltd makes no representation or guarantee that their services or this report will result in any enhancement of the Client.

COPYRIGHT STATEMENT: The concepts and information contained in this document (except the client's own copy information) are the property of Tunley Environmental Ltd. Use, copying or distribution to any third party is expressly prohibited. We do not accept any liability if this report is used for an alternative purpose from which it is intended, nor to any third party in respect of this report or of this document in whole or in part, by anyone other than the addressed recipients. Any such third-party disclosures without the written permission of Tunley Environmental Ltd constitutes an infringement of copyright.