

Land West of Yarnton

Biodiversity Net Gain Assessment

Including off-site habitat provision to benefit Skylark

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1 Introduction

1.1 Background and Proposals

- 1.1.1 Aspect Ecology is advising Merton College Oxford in respect of ecological matters relating to land west of Yarnton, Oxfordshire.
- 1.1.2 The proposals are for the construction of up to 540 dwellings with associated access, landscaping and green open space.
- 1.1.3 Aspect Ecology has previously prepared a Biodiversity Net Gain (BNG) Assessment in May 2022 utilising the Biodiversity Metric 3.1 calculation tool¹ to inform the planning application (ref: 21/03522/OUT). Following the submission of this document, the BNG calculation tool has been updated to version 4.0. As such, an updated BNG Assessment has been undertaken using version 4.0 of the calculation tool developed by Natural England and informed by biodiversity net gain guidance developed by CIRIA, CIEEM and IEMA to ensure an up to date assessment is available.

1.2 Biodiversity Net Gain

Environment Act

- 1.2.1 The Environment Act establishes a comprehensive legal framework for environmental improvement within the UK, forming one of the key measures to deliver the vision set out under the 25 Year Environment Plan.
- 1.2.2 The Environment Act is intended to establish the structure for long-term environmental governance and accountability and includes key measures to drive improvements for nature. In particular, it lays the foundation for a Nature Recovery Network, and introduces a mandatory requirement for biodiversity net gain in the planning system, to ensure that new developments enhance biodiversity and create new green spaces for local communities to enjoy. This will require developments to deliver a 10% improvement in biodiversity value, albeit this will not be a legal requirement until the legislation is finalised, currently anticipated to be January 2024.

Good Practice Principles for Development

- 1.2.3 CIRIA, CIEEM and IEMA have developed a set of principles on good practice to achieve Biodiversity Net Gain², accompanied by a practical guide³. These principles 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. They also provide a way for industry to show that projects follow good practice. Ten key principles are identified:

- 1) **Apply the Mitigation Hierarchy.** Do everything possible to first avoid and then minimise impacts on biodiversity. Only as a last resort, and in agreement with external decision-makers where possible, compensate for losses that cannot be avoided. If compensating for losses within the development footprint is not possible or does not

¹ Aspect Ecology (2022) Technical Note TN03: *Biodiversity Net Gain Assessment Using Defra Biodiversity Metric 3.1 Calculation Tool*.

² CIEEM, CIRIA, IEMA (2016) *Biodiversity Net Gain: Good practice principles for development*.

³ CIEEM, CIRIA, IEMA (2019) *Biodiversity Net Gain: Good practice principles for development. A practical guide*.

generate the most benefits for nature conservation, then offset biodiversity losses by gains elsewhere.

- 2) **Avoid losing biodiversity that cannot be offset by gains elsewhere.** Avoid impacts on irreplaceable biodiversity - these impacts cannot be offset to achieve No Net Loss or Net Gain.
- 3) **Be inclusive and equitable.** Engage stakeholders early, and involve them in designing, implementing, monitoring and evaluating the approach to Net Gain. Achieve Net Gain in partnership with stakeholders where possible, and share the benefits fairly among stakeholders.
- 4) **Address risks.** Mitigate difficulty, uncertainty and other risks to achieving Net Gain. Apply well-accepted ways to add contingency when calculating biodiversity losses and gains in order to account for any remaining risks, as well as to compensate for the time between the losses occurring and the gains being fully realised.
- 5) **Make a measurable Net Gain contribution.** Achieve a measurable, overall gain for biodiversity and the services ecosystems provide while directly contributing towards nature conservation priorities.
- 6) **Achieve the best outcomes for biodiversity.** Achieve the best outcomes for biodiversity by using robust, credible evidence and local knowledge to make clearly-justified choices when:
 - Delivering compensation that is ecologically equivalent in type, amount and condition, and that accounts for the location and timing of biodiversity losses
 - Compensating for losses of one type of biodiversity by providing a different type that delivers greater benefits for nature conservation
 - Achieving Net Gain locally to the development while also contributing towards nature conservation priorities at local, regional and national levels
 - Enhancing existing or creating new habitat
 - Enhancing ecological connectivity by creating more, bigger, better and joined areas for biodiversity
- 7) **Be additional.** Achieve nature conservation outcomes that demonstrably exceed existing obligations (i.e. do not deliver something that would occur anyway).
- 8) **Create a Net Gain legacy.** Ensure Net Gain generates long-term benefits by:
 - Engaging stakeholders and jointly agreeing practical solutions that secure Net Gain in perpetuity
 - Planning for adaptive management and securing dedicated funding for long-term management
 - Designing Net Gain for biodiversity to be resilient to external factors, especially climate change
 - Mitigating risks from other land uses
 - Avoiding displacing harmful activities from one location to another
 - Supporting local-level management of Net Gain activities
- 9) **Optimise sustainability.** Prioritise Biodiversity Net Gain and, where possible, optimise the wider environmental benefits for a sustainable society and economy.
- 10) **Be transparent.** Communicate all Net Gain activities in a transparent and timely manner, sharing the learning with all stakeholders.

2 Methodology

2.1 Habitat Survey

- 2.1.1 As detailed within the Ecological Baseline⁴ and Addendum to the Environment Statement⁵, the site was originally subject to an extended phase 1 habitat survey in August 2018, with updated survey work conducted in April 2020 and September 2021 in order to ascertain the general ecological value of the land contained within the boundaries of the site and to identify the main habitats and ecological features present.
- 2.1.2 The site was surveyed based on standard Phase 1 Habitat Survey methodology⁶, whereby the habitat types present are identified and mapped, together with an assessment of the species composition of each habitat. The site was classified into areas of similar botanical community types, with a representative species list compiled for each habitat identified. The nomenclature used for plant species is based on the Botanical Society for the British Isles (BSBI) Checklist.
- 2.1.3 In line with guidance⁷, the fine scale minimum mapping unit (MMU) of 25m² in area or 5m in length has been used where possible / relevant.

2.2 Survey Constraints and Limitations

- 2.2.1 All of the species that occur in each habitat would not necessarily be detectable during survey work carried out at any given time of the year, since different species are apparent during different seasons. The Phase 1 habitat survey was undertaken within the optimal season and therefore a robust assessment of the habitats and botanical interest across the site could be made.

2.3 Biodiversity Net Gain Assessment

- 2.3.1 To quantify the level of biodiversity net gain that can be delivered under the proposed development, the change in biodiversity value resulting from the scheme has been calculated using the Metric 4.0 calculation tool and associated user guide⁸. This takes account of the size, distinctiveness and ecological condition of existing and proposed habitat areas to provide a proxy measure of the present and forecast biodiversity value of a site, and therefore determine the overall change in biodiversity value. These calculations are detailed within the extracts provided at Appendix 5436/1.
- 2.3.2 To establish the habitat baseline, broad habitat areas have been identified based on the survey work undertaken at the site, with habitat condition assigned based on the guidance set out in the Technical Supplement⁹ and professional judgement.
- 2.3.3 The post-development habitat creation and enhancement is based on the drawing 'PR9 Framework Plan' (ref: DE234_12 rev. H). A number of assumptions have been made in terms of the detailed landscaping and management proposals, based on comparative

⁴ Aspect Ecology (2020) Ecological Baseline

⁵ Aspect Ecology (2022) Technical Note TN04: *Addendum to Chapter 8 of the Environment Statement (ES) – Ecology and Nature Conservation*

⁶ Joint Nature Conservation Committee (2010, as amended) '*Handbook for Phase 1 habitat survey: A technique for environmental audit.*'

⁷ The UK Habitat classification User Manual. Version 1.1. 2020

⁸ Natural England (March 2023) *Natural England Joint Publication JP039. Biodiversity Metric 4.0: User Guide.*

⁹ Natural England (March 2023) *Natural England Joint Publication JP039. The Biodiversity Metric 4.0: Technical Annex 1: Condition Assessment and Methodology.*

developments and what is realistic and feasible under the proposed land uses and landscape space types. Further details of assumptions made in populating the metric are provided at Chapter 4 below.

3 Habitats and Ecological Features

3.1 Overview

- 3.1.1 The site is dominated by arable, semi-improved grassland and improved grassland, with areas of woodland, tall ruderal and recolonising ground. Hedgerows are present across the site, in addition to a number of trees and ponds.
- 3.1.2 A full description of habitats is provided within the separate Ecological Baseline¹⁰ and Addendum to the Environment Statement¹¹, and illustrated on Plan 5436/BNG1. The results of the habitat condition assessment are set out at Appendix 5436/2.

¹⁰ Aspect Ecology (2020) Ecological Baseline

¹¹ Aspect Ecology (2022) Technical Note TN04: *Addendum to Chapter 8 of the Environment Statement (ES) – Ecology and Nature Conservation*

4 Post-development Habitats

4.1 Assumptions

4.1.1 When inputting the post-development habitat areas and condition to the Metric 4.0, the following assumptions have been made:

- Newly created habitat under the proposals will be managed appropriately to reach the assigned target condition (anticipated to be defined by a future management plan);
- Future management prescriptions at the site within areas of retained and proposed 'other neutral' grassland at the site will be subject to a traditional meadow management regime (including a hay cut after flowering in July / August), in order to meet all condition assessment criteria (including maintaining the presence of a minimum 10 species per m²) to qualify as this habitat type;
- Where woodland rides are to be provided, as the woodlands that they fall within will continue to have greater than 20% canopy cover as defined within the UK Forestry Standard (2023), they are assessed to form part of the 'community woodland'. However, as the individual scrub and grassland elements are greater than the MMU, they have been measured separately;
- New tree planting has been provided where considered appropriate, in line with the recommendations of paragraph 131 of the NPPF (2023); and
- It is anticipated that the majority of hedgerows at the site can be fully retained under the proposals. Areas of new hedgerow planting have been indicated in order to show the extent required to achieve a net gain, though the final detailed design may require some changes to their location.

4.2 Good Practice Principles for Development

4.2.1 Provided below is a summary of how biodiversity net gain good practice principles have been applied at the site:

- 1) Apply the Mitigation Hierarchy.** The mitigation hierarchy has been followed with the retention of the woodland, the majority of hedgerows, and siting the majority of development within arable habitat which is of lower relative ecological value. Some areas of this habitat are unavoidably lost to the development footprint, which are compensated for by new planting at the site. The majority of the habitat loss arises from low distinctiveness arable and grassland.
- 2) Avoid losing biodiversity that cannot be offset by gains elsewhere.** No irreplaceable habitats are lost. Where medium distinctiveness habitat is lost this is offset by new areas of medium distinctiveness habitat creation and enhancement.
- 3) Be inclusive and equitable.** Further discussions will be held as required, in order to maximise the ecological benefit under the detailed landscape design.
- 4) Address risks.** The Metric 4.0 has an inbuilt difficulty multiplier which allows for the time between losses and the gains to be incorporated into the final score.

- 5) **Make a measurable Net Gain contribution.** A measurable significant net gain is demonstrated by the Metric. In addition, faunal specific benefits will be provided by the scheme, which are not included within the metric.
- 6) **Achieve the best outcomes for biodiversity.** The existing woodland and, as far as practicable, the majority of hedgerows and areas of medium distinctiveness grassland will be retained at the site. Furthermore, the site will in general benefit from the enhancement of the retained grassland, and provision of additional grassland, native woodland, hedgerows, Sustainable Drainage Systems (SuDS), and generous new tree planting, far above the existing situation.
- 7) **Be additional.** The provision of new woodland, hedgerows, grassland, SuDS and tree planting at the site will create ecologically valuable habitats and improve connectivity for wildlife at the site, which would not otherwise occur without significant intervention. Furthermore, the inclusion of off-site enhancements to create a 6m wide arable field margin will create additional ecologically valuable habitats and provide a benefit for Skylark.
- 8) **Create a Net Gain legacy.** The retained woodland, retained and enhanced grassland, retained hedgerows, in combination with the new woodland, hedgerows, grassland, SuDS and tree planting, will be managed for the benefit of nature conservation for the lifetime of the development (likely to be secured by a planning condition).
- 9) **Optimise sustainability.** Overall the new habitats will provide an enhanced biodiversity network compared to the existing situation.
- 10) **Be transparent.** This report ensures the proposals are well communicated to stakeholders.

4.3 Strategic Significance

4.3.1 Strategic significance in the metric is assigned to give extra value to habitats that are located in optimal locations, or are of a type that meet local objectives for biodiversity. As the site does not fall within any Conservation Target Areas (CTA's), no strategic significance has been applied to the habitats pre or post-development of the site.

4.4 Updates from Biodiversity Metric 3.1

4.4.1 Following the publication of version 4.0 of the Biodiversity Metric, a number of associated guidance documents have been updated to reflect its evolving nature. As such, a number of changes have been incorporated into the updated BNG Assessment as detailed below:

- The previously identified 'other neutral grassland' and 'modified grassland' which was to be enhanced to create 'lowland mixed deciduous woodland' has been amended to state that it is lost and 'other woodland; broadleaved' created (in line with Section 3.2.3 of the User Guidance);
- Due to the existing 'modified grassland' in 'moderate' condition failing criterion 1 of version 4.0 of the metric (requiring 6-8 species per m² to achieve anything greater than 'poor' condition), it has been re-assigned to 'poor' condition;
- Where 'other woodland; mixed' was to be created, this has been updated to 'other woodland; broadleaved' to achieve an enhanced biodiversity outcome;

- Indicative woodland rides have been identified to provide a further enhancement to the community woodland and created through the use of other neutral grassland and mixed scrub to provide a valuable ecotone;
- Tree provision is now shown at the site; and
- The strategic significance multiplier has been set to ‘area / compensation not in local strategy / no local strategy’ in line with Section 4.3 above.

4.4.2 Although the existing other neutral grassland is of ‘poor’ condition when assessed against the condition assessment criteria detailed within version 4.0 of the Metric, to accord with the condition assignment in version 3.1 of the Metric which registered it to ‘moderate’ condition due to the presence of an indicator species, this has also been upgraded to ‘moderate’ to ensure consistency with the previous assessment approach and provide a conservative assessment.

4.5 Habitat Type and Condition

4.5.1 A summary of post-development habitat creation is set out in Tables 4.1 – 4.4 below, illustrated on Plan 5436/BNG2, and with an assessment of the habitat condition assessment criteria set out at Appendix 5436/2.

Table 4.1. Post-development Habitat Enhancement (on-site)

Habitat Change	Condition Change	Condition Rationale
Grassland: Modified Grassland → Grassland: Other Neutral Grassland and Grassland: Other Neutral Grassland → Grassland: Other Neutral Grassland	Moderate → Good	<p>The existing modified grassland and other neutral grassland will be retained throughout the areas of public open and enhanced to other neutral grassland in ‘good’ condition. Through scarification, over-seeding with a suitable wildflower mix and implementation of traditional hay-meadow management (including a hay cut after flowering in July / August) and potential maintenance through low-intensity grazing within open areas, it is anticipated that this habitat will meet all condition assessment criteria as detailed below such that it achieves a ‘good’ condition:</p> <ul style="list-style-type: none"> - A: the grassland is anticipated to be a good representation of other neutral grassland through the seeding of an appropriate wildflower mix and the management detailed above; - B: a varied sward height is anticipated to be readily achievable through the management detailed above; - C: the cover of bare ground of between 1-5% is anticipated to be achievable through the natural colonisation of fauna such as Rabbits and formal paths. Should colonisation not occur or the level of bare ground provided by the paths be insufficient, this could be

		<p>achieved through creating scrapes throughout the grassland;</p> <ul style="list-style-type: none"> - D: the management detailed above will ensure that the cover of Bracken is less than 20% and the cover of scrub is less than 5%; - E: the ongoing management (including the removal of arisings) will ensure that nutrient levels are kept low such that indicators of sub-optimal conditions account for less than 5% of the total area. Furthermore, the maintenance of paths is anticipated to prevent excessive poaching or other physical damage; and - F: through the above management and seeding with an appropriate wildflower mix, a diversity of 10 or more vascular plant species per m² is considered to be readily achievable. Should this target not be being achieved, this can be rectified through remediation measures such as the planting of Yellow Rattle to reduce the abundance of grasses.
Lakes: Ponds (Non-Priority Habitat) → Lakes: Ponds (Non-Priority Habitat)	Moderate → Good	The retained standing water features will be enhanced through the introduction of an appropriate management regime to encourage a diverse and abundant aquatic flora to develop, including emergent, submerged and floating plants. This will involve management of bankside vegetation to reduce shading and may involve planting of new native species within the features. On this basis, it is considered that the features will meet all assessment criteria for this habitat type and achieve a 'good' condition.

Table 4.2. Post-development Habitat Enhancement (off-site)

Habitat Change	Condition Change	Condition Rationale
Cropland: Cereal Crops → Cropland: Arable Field Margins Game Bird Mix	Low → Medium	A 6m arable field margin ¹² will be created within off-site arable land located at the south-western site boundary. To maximise the benefit of this habitat for Skylark, a suitable seed mix such as 'wild bird seed mixture (HF02) ¹³ or similar could be utilised. This is anticipated to provide important foraging and nesting resources and be subject to ecologically sensitive management to benefit Skylark <i>Alauda arvensis</i> .

¹² UK Biodiversity Action Plan Priority Habitat Descriptions – Arable Field Margins. UK Biodiversity Action Plan. BRIG (ed. Ant Maddock) 2008.

¹³ see specification within 'Climate Change Adaptation Manual: Evidence to Support Nature Conservation In a Changing Climate – Part 9 Arable Field Margins' Natural England. 2020

Table 4.3. Post-development Habitat Creation (on-site)

Habitat	Target Condition	Condition Rationale
Woodland and Forest: Other Woodland; Broadleaved	Moderate	The scheme will include areas of new woodland planting comprising a diverse mix of native species. It is anticipated that the woodland will meet the majority of the assessment criteria, with the exception of those relating to veteran / ancient trees. As such, the woodland is considered likely to achieve a 'moderate' condition.
Grassland: Other Neutral Grassland	Good	<p>Areas of wildflower grassland will be created within the site, including a number of meadows and a woodland ride. The grassland will be managed based on ecological principles using traditional hay-meadow management techniques (including a hay cut after flowering in July / August) with the option of low-intensity grazing of the aftermath within open areas. On this basis, it is anticipated that this habitat will meet all condition assessment criteria as detailed below such that it achieves a 'good' condition:</p> <ul style="list-style-type: none"> - A: the grassland is anticipated to be a good representation of other neutral grassland through the seeding of an appropriate wildflower mix and the management detailed above; - B: a varied sward height is anticipated to be readily achievable through the management detailed above; - C: the cover of bare ground of between 1-5% is anticipated to be achievable through the natural colonisation of fauna such as Rabbits and formal paths. Should colonisation not occur or the level of bare ground provided by the paths be insufficient, this could be achieved through creating scrapes throughout the grassland; - D: the management detailed above will ensure that the cover of Bracken is less than 20% and the cover of scrub is less than 5%; - E: the ongoing management (including the removal of arisings) will ensure that nutrient levels are kept low such that indicators of sub-optimal conditions account for less than 5% of the total area. Furthermore, the maintenance of paths is anticipated to prevent excessive poaching or other physical damage; and

		<ul style="list-style-type: none"> - F: through the above management and seeding with an appropriate wildflower mix, a diversity of 10 or more vascular plant species per m² is considered to be readily achievable. Should this target not be being achieved, this can be rectified through remediation measures such as the planting of Yellow Rattle to reduce the abundance of grasses.
Grassland: Other Neutral Grassland	Moderate	<p>Areas of wildflower grassland will be created in greenspaces in proximity of the development. The grassland will be managed based on ecological principles using traditional hay-meadow management techniques (including a hay cut after flowering in July / August). However, due to the smaller overall areas and as these will fall in close proximity to the build development, a 'moderate' condition has been selected on a precautionary basis. This is on the basis of passing condition assessment criteria A, B and D as detailed below:</p> <ul style="list-style-type: none"> - A: the grassland is anticipated to be a good representation of other neutral grassland through the seeding of an appropriate wildflower mix and the management detailed above; - B: a varied sward height is anticipated to be readily achievable through the management detailed above; and - D: the management detailed above will ensure that the cover of Bracken is less than 20% and the cover of scrub is less than 5%. <p>In reality, the management will aim to achieve a higher condition and meet more condition assessment criteria, albeit a 'moderate' condition has been utilised within the Metric to provide a conservative assessment.</p>
Heathland and shrub: Mixed scrub	Good	<p>Areas of native scrub planting will be included within woodland rides, which will include a minimum of three woody species. No invasive or undesirable species to be included. A well-developed edge and good age range can be developed over time and planting will be intersected with a glade through the centre comprising other neutral grassland. The scrub is therefore expected to achieve a 'good' condition.</p>
Urban: Sustainable Urban Drainage	Moderate	<p>Numerous sustainable urban drainage features are to be created as part of the proposed development and it is anticipated that they will meet two of the three</p>

		core condition assessment criteria for this habitat type and will therefore achieve a score of 'moderate'.
Urban: Developed Land; Sealed Surface	N/A	No assessment required. <i>Note: Area coded accounts for 70% of the residential area, the remaining 30% of residential area is coded as 'Urban: Vegetated Garden'.</i>
Urban: Vegetated Garden	N/A	No assessment required. <i>Note: Area coded accounts for 30% of residential area, the remaining 70% is coded as 'Urban: Developed Land' Sealed Surface</i>
Urban – Urban tree	Moderate	Native trees to be planted throughout the site within areas of open space, expected to achieve a 'moderate' condition within 30 years with suitable management.
Urban – Urban tree	Poor	Non-native species / cultivars to be planted within and adjacent to the built development, considered unlikely to exceed a 'poor' condition within 30 years.

Table 4.4. Post-development Linear Feature (Hedgerow) Creation (on-site)

Habitat	Target Condition	Condition Rationale
Species-rich Native Hedgerow with Trees	Moderate	New native hedgerow planting will be undertaken at the site as part of the proposed development, connecting with existing hedgerows and other habitats to enhance connectivity within and around the site. The hedgerows will be managed based on ecological principles and it is considered that the hedgerows will meet the majority of the condition assessment criteria, with the exception of those relating to mature standard trees. As such, a condition of 'moderate' is considered achievable.

5 Biodiversity Net Gain Assessment Results

5.1 Metric calculation

5.1.1 The data from the baseline habitat survey work and the proposed habitat enhancement and creation works have been coded into the Metric.

5.1.2 In summary, the Metric indicates that the development will result in a 40.76 (14.46%) gain in habitat units and a 12.74 (14.56%) gain in hedgerow units with all trading rules satisfied. The results are illustrated down in Table 5.1 below:

Table 5.1 Net gain assessment results

Unit Type	Change in Units	% Change
Habitats	40.76	14.46%
Hedgerows	12.74	14.56%

5.2 Additional benefits not captured by the Metric

Faunal Benefits

5.2.1 Further biodiversity benefits will be provided by faunal enhancements, for example through the provision of new bat and bird boxes (at a ratio of one per dwelling), hedgehog domes, amphibian and reptile hibernacula and bee bricks (which can be secured via suitably worded planning conditions). Furthermore, the enhancement of off-site land to create a 6m wide field margin managed for the benefit of Skylark is anticipated to provide a significant benefit to the species¹⁴ alongside other fauna. Such faunal enhancements are not quantified under the Metric as this deals with habitats alone and does not address faunal benefits. In addition, the value of a number of new gardens will likely be of higher value than the stipulated condition under the Metric.

In perpetuity management

5.2.2 Notwithstanding that the standard for management of BNG land within the Environment Act 2021 is 30 years, in this instance, the applicant has agreed that management of the new green open space will be provided for the lifetime of the development. An organisation with considerable experience will be selected for delivering the habitat creation and management at the site for this period. It is anticipated that the mechanism for funding of the management of the green open space for the lifetime of the development will be agreed at the reserved matters stage as part of a future application. The details can be secured by imposing a suitable condition on the outline planning consent, for example as part of a Landscape and Ecological Management Plan (LEMP).

¹⁴ Field margins as foraging habitat for skylarks (*Alauda arvensis*) in the breeding season. Kuiper et al . Agriculture, Ecosystems & Environment. Vol. 170. P10-15. April 2013

6 Summary and Conclusions

- 6.1.1 Aspect Ecology is advising Merton College Oxford in respect of ecological matters relating to land west of Yarnton, Oxfordshire proposed for new residential development.
- 6.1.2 To inform the application, Aspect Ecology has undertaken an updated BNG assessment to determine the level of biodiversity net gain that could be achieved under the scheme, based on the Metric 4.0 calculation tool.
- 6.1.3 The metric demonstrates that a 14.46% biodiversity net gain is achieved in habitat units and 14.56% in hedgerow units.