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Biodiversity net gain assessment

Poplars Farm, Hardwick

Site	*Poplars Farm, Hardwick*
Project number	*118921*
Client name / Address	*ACH Planning Limited, The Studio, 17 Nearton End, Swanbourne, Milton Keynes, MK17 0SL*

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Declaration of compliance

The information which we have provided is true, and has been prepared and provided in accordance with the Chartered Institute of Ecology and Environmental Management's (CIEEM) Code of Professional Conduct. We confirm that the opinions expressed are our true and professional bona fide opinions.

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1. EXECUTIVE SUMMARY

In October 2021 MKA Ecology Limited was commissioned to undertake a Biodiversity Net Gain assessment for Poplars Farm, Hardwick. This Biodiversity Net Gain assessment has been prepared to detail how the biodiversity enhancements in the proposed scheme will lead to an overall benefit to biodiversity.

The proposed outline development at Poplars Farm involves the redevelopment of the site to deliver a small-scale residential scheme. The habitats that will be included in the proposed development include buildings, hardstanding, vegetated gardens, shrubs, urban trees and native species-rich hedgerows. The existing line of trees on the northern boundary will be retained.

To provide an objective assessment of the potential value of the proposed biodiversity enhancements, the Defra Biodiversity Metric 3.0 (Panks *et al.,* 2021) is applied. The measures, a proxy for biodiversity that use habitat types and their areas, are compared before (the existing condition) and after the completion of the proposed development.

It is concluded that the proposed development will lead to a 20% net gain in area-based habitat units and 130% net gain in linear-based habitat units, a significant overall enhancement. This is due to the low ecological value of the existing site, in tandem with retention of the line of trees and creation of habitats of ecological value.

2. INTRODUCTION

2.1. Purpose

The purpose of this assessment is to review the existing biodiversity value of the site, comparing this to the proposed landscape masterplan and calculate an overall biodiversity net change for the site. The primary method of calculating this change will follow the Defra Biodiversity Metric 3.0 (Panks *et al.,* 2021). The aim of using this method is to demonstrate whether the proposed development and landscape masterplan will deliver a net gain in biodiversity.

The process of achieving and assessing Biodiversity Net Gain should follow the following principles and rules, as set out within *Biodiversity Net Gain, Good Practice Principles for Development* (Baker, 2019) (Table 1) and *The Biodiversity Metric 3.0: auditing and accounting for biodiversity value. User guide* (Panks *et al.,* 2021) (Table 2).

Table 1: The UK's good practice principles for biodiversity net gain (Baker, 2019)

Principle	In practice
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 generate the most benefits for nature conservation, then offset biodiversity losses by gains elsewhere.
2. Avoid losing biodiversity that cannot be offset elsewhere	Avoid impacts on irreplaceable biodiversity – these impacts cannot be offset to achieve NNL/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.
4. Address risk	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 losses occurring and gains being fully realised.
5. Make a measurable net gain contribution	Achieve a measurable, overall gain1 for biodiversity and the services ecosystems provide while directly contributing towards nature conservation priorities

Principle	In practice
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 and • Supporting local-level management
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.

Table 2: Biodiversity net gain rules (*Panks et al.*, 2021)

Rule	In practice
1	Where the metric is used to measure change in biodiversity unit values need to be calculated prior to the intervention and post-intervention for all parcels of land/linear features affected
2	Compensation for habitat losses can be provided by creating new habitat, by restoring or enhancing existing habitats, or by accelerating successional processes. Measures to improve existing habitats must provide a significant and demonstrable uplift in distinctiveness and/or condition to record additional biodiversity units
3	'Trading down' must be avoided. Losses of habitat are to be compensated for on a "like for like" or "like for better" basis, new or restored habitats should aim to achieve a higher distinctiveness and /or condition than habitats lost.
4	Biodiversity unit values generated by biodiversity metric 3.0 are unique to this metric and cannot be compared to unit outputs from version 2.0, the original DEFRA metric or any other biodiversity metric. Furthermore, the three types of biodiversity units generated by this metric (for area, hedgerow and river habitats) are unique and cannot be summed.
5	It is not the area of habitat that determines whether the ecological equivalence or better has been achieved but the net change in biodiversity units. Risks associated with enhancing or creating habitats mean that it may be necessary to enhance or create a larger area of habitat than lost to fully compensate for impacts on biodiversity

Rule	In practice
6	Deviations from the published method of biodiversity metric 3.0 need to be ecologically justified. While the methodology is expected to be suitable in the majority of circumstances it is recognised that there may be exceptions. Any local or project-specific adaptation of the metric must be transparent and fully justified.

3. HABITATS

3.1. Present – baseline condition

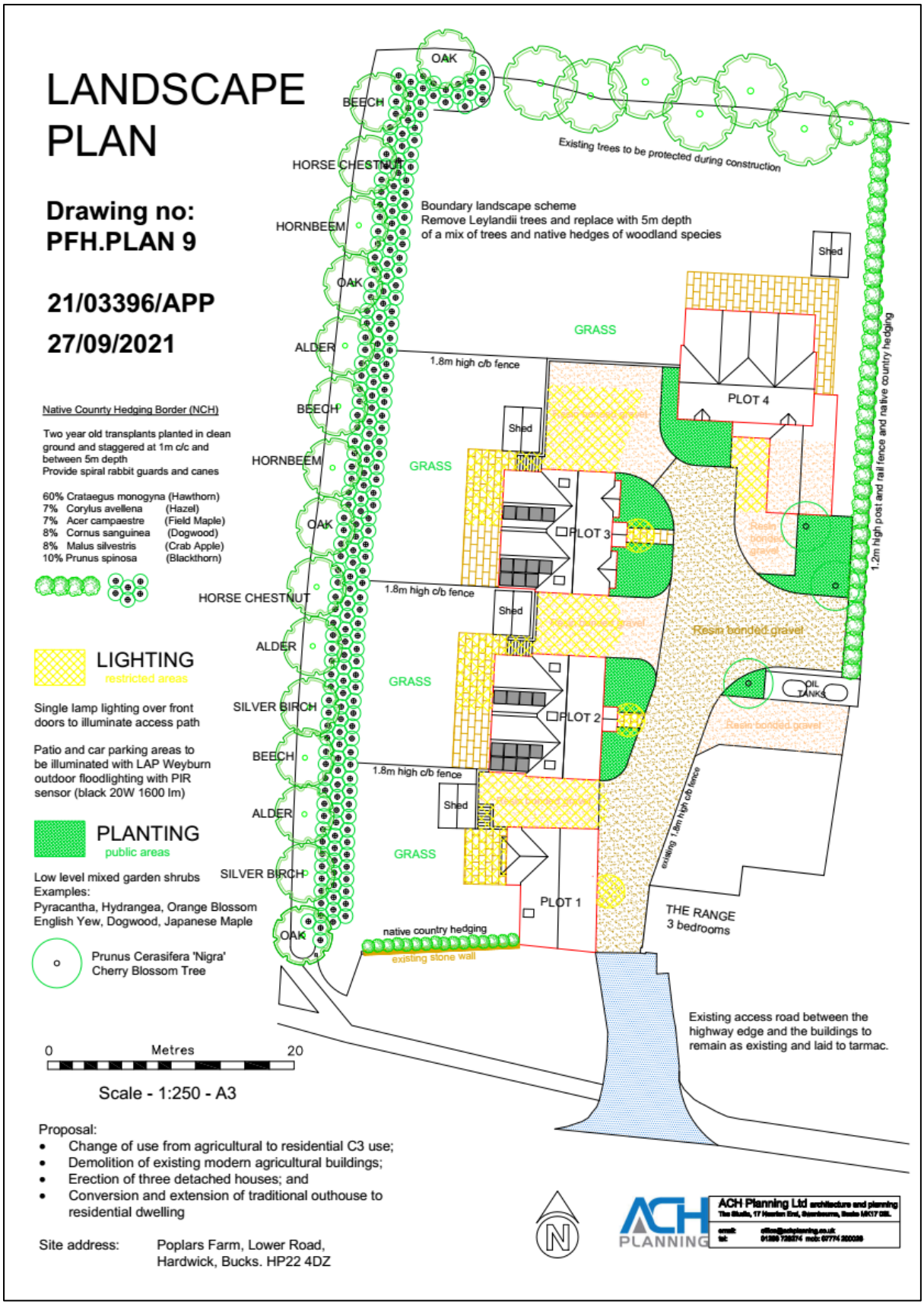
The Preliminary Ecological Appraisal (PEA), carried out by MKA Ecology Ltd on 21 October 2021 (MKA Ecology Ltd, 2021), identified that the site comprises buildings, hardstanding, bare ground and modified grassland and covers a total of 0.28 hectares. The habitats at the site were mapped during the PEA and are presented in Figure 1. The areas occupied by each habitat type are detailed in Table 4 in the next section.

3.2. Future – proposed landscape and enhancements

The proposed outline development at Poplars Farm, Hardwick is presented in Figure 2. It will involve the demolition of the existing modern farm buildings (Buildings 1 and 2), and the conversion of the outhouse (Building 3). The majority of existing habitats will be impacted, although the line of trees on the northern boundary will be retained. Four new dwellings will be constructed with associated access, car parking and soft landscaping. The landscaping plans include residential gardens, introduced shrub planting and street tree planting and are presented in Figure 2. New hedgerows will also be established on site, including species-rich native hedgerows with trees and species-rich native hedgerows. It is these proposed habitats that will form the basis of the calculation of 'net-change' in biodiversity using the Defra metric (see Section 4).

Figure 1: Habitats at Poplars Farm, Hardwick

Figure 2. Proposed outline landscape masterplan (ACH Planning Ltd, 2021)



4. METHODOLOGIES

To establish whether the proposed development will contribute positively to biodiversity we use the Defra Biodiversity Metric 3.0 (Panks *et al.,* 2021). This method uses habitat as a proxy for biodiversity and its primary application is to provide planners and developers with a method of establishing how much and what type of habitats should be created or enhanced in order to ensure that the impacts of a development do not result in a net loss of biodiversity. Habitats are assigned the following scores:

- Distinctiveness: A measure of the type and importance of a habitat.
- Condition: A measure of the present or predicted condition of a habitat type.
- Strategic significance: How a habitat is regarded within Local Planning Policy.

For proposed habitats, where there is an attempt to predict the habitat type following establishment additional handicaps or risk scores are imposed representing the following factors:

- Difficulty: More difficult habitats incur a greater risk.
- Time to condition: In general, it takes longer for habitats to reach a better condition, plus certain habitats by their very nature take longer to create or restore.
- If the creation or enhancement of habitats is delayed, an additional risk score is applied. This will not apply in the present case.
- If habitats are created off-site, an additional risk score is applied. This will not apply in the present case.

Further details on how the metric is calculated is provided in the aforementioned publications, with more site specific detail provided in Appendix 1 and 2.

4.1. Mapping habitats

Current habitats were taken from the PEA and calculated using QGIS. The proposed habitats were calculated in QGIS using a digitised and geo-referenced version of the Landscaping Plan provided in Figure 2.

For the purposes of the calculation of area-based biodiversity units, any hedgerows in both the current and proposed habitats are excluded, these being accounted for separately as a linear measure (see Section 4.2).

4.2. Assignment of habitats

Biodiversity units are the product of the area of habitat and various factors or 'multipliers'. There are three 'core' multipliers that apply to both the current and proposed habitat areas and a further four that apply only to the proposed habitats. These are detailed further in Table 3 below.

Table 3: Multipliers used in the calculation of Biodiversity Net Gain

Multiplier	When applied	Description
Distinctiveness	Before and after	A measure of the type of habitat, automatically assigned within the Metric 2.0. Habitats with greater value are assigned a higher score
Condition	Before and after	The condition of the habitat. Uses the Technical Supplement (*Crosher et al. 2019a*); Higher levels of condition give rise to greater values. In some cases, no condition assessment is required and these habitats are automatically allocated a score.
Strategic significance	Before and after	Whether a habitat is important within its local context.
Time to target condition	After	Used to account for the fact that habitat creation as part of a development is rarely instant. A 'handicap' is applied, with habitats that take longer to establish resulting in a greater reduction.
Difficulty of creation/restoration	After	Habitats that are more difficult to create/restore cause a reduction in the biodiversity unit as they are associated with a greater risk of failure.
Spatial risk	After	Habitat that is created at a greater distance away from the development site carries a greater risk of removing other natural habitats.
Advanced and delayed habitat creation	After	Used to account for situations where there is a mismatch between a negative impact on biodiversity and work to create or enhance the 'post-intervention habitats'. This can either be in the form of habitat creation occurring in advance or being delayed beyond the point of baseline losses.

4.3. Hedgerows

Hedgerows, given their unique linear characteristic and their position as 'edge habitats' are treated separately, giving 'biodiversity metres'. The metrics calculated for hedgerows will therefore be calculated and presented separately. Current hedgerow lengths were calculated using QGIS. Proposed hedgerow lengths were calculated from a digitised and geo-referenced version of the Landscape Plan provided in Figure 2 using QGIS.

4.4. Assumptions and constraints

Several assumptions are made to enable this biodiversity net gain assessment. The primary assumptions are listed below:

- The net gains in biodiversity that are estimated are reliant on the successful restoration and/or creation of habitats and their maintenance for the foreseeable future.

- Area-based habitats are mapped to the centre line of linear-based habitats. This will result in a slight overestimation of the area and resulting biodiversity units generated by habitats adjacent to hedgerows or lines of trees

Table 4: Attribution of multiplier levels to each habitat type at present and for the proposed development

Habitat type and area	Multiplier (and score)						
	Distinctiveness (automatically assigned)	Condition	Strategic significance	Standard or adjusted time to target conditon	Time to target condition	Difficulty of creation/ enhancement	Spatial risk
Current							
Developed land, sealed surface (Buildings) (0.0328 ha)	V.Low (0)	N/A – Other (0)	Low (1)	-	-	-	-
Developed land, sealed surface (Hardstanding) (0.0475 ha)	V.Low (0)	N/A – Other (0)	Low (1)	-	-	-	-
Artificial unvegetated, unsealed surface (0.119 ha)	V.Low (0)	N/A – Other (0)	Low (1)	-	-	-	-
Modified grassland (0.0596 ha)	Low (2)	Moderate (2)	Low (1)	-	-	-	-
Modified grassland (0.0249 ha)	Low (2)	Poor (1)	Low (1)	-	-	-	-
Proposed (retained)							
Developed land, sealed surface (Hardstanding) (0.0085 ha)	V.Low (0)	N/A – Other (0)	Low (1)	-	-	-	-
Proposed (newly created)							
Developed land, sealed surface (Buildings) (0.0482 ha)	V.Low (0)	N/A – Other (0)	Low (1)	Standard	0 (1)	Medium (0.67)	Within site
Developed land, sealed surface (Hardstanding) (0.0656 ha)	V.Low (0)	N/A – Other (0)	Low (1)	Standard	0 (1)	Medium (0.67)	Within site
Vegetated garden (0.1484 ha)	Low (2)	Poor (1)	Low (1)	Standard	1 (0.965)	Low (1)	Within site

Habitat type and area	Multiplier (and score)						
	Distinctiveness (automatically assigned)	Condition	Strategic significance	Standard or adjusted time to target conditon	Time to target condition	Difficulty of creation/ enhancement	Spatial risk
Introduced shrub (0.0126 ha)	Low (2)	Poor (1)	Low (1)	Standard	1 (0.965)	Low (1)	Within site
Urban tree (0.0122 ha)	Medium (4)	Poor (1)	Low (1)	Standard	10 (0.7)	Low (1)	Within site

Table 5: Attribution of multiplier levels to each hedgerow type at present and for the proposed development

Habitat type and area	Multiplier (and score)						
	Distinctiveness (automatically assigned)	Condition	Strategic significance	Standard or adjusted time to target conditon	Time to target condition	Difficulty of creation/ enhancement	Spatial risk
Current							
Line of trees (0.072 km)	Low (2)	Poor (1)	Low (1)	-	-	-	-
Line of trees (ecologically valuable) (0.051 km)	Medium (4)	Moderate (2)	Low (1)	-	-	-	-
Proposed (retained)							
Line of trees (ecologically valuable) (0.051 km)	Medium (4)	Moderate (2)	Low (1)	-	-	-	-
Proposed (newly created)							

Habitat type and area	Multiplier (and score)						
	Distinctiveness (automatically assigned)	Condition	Strategic significance	Standard or adjusted time to target conditon	Time to target condition	Difficulty of creation/ enhancement	Spatial risk
Native species-rich hedgerow with trees (0.072 km)	High (6)	Good (3)	Low (1)	Standard	20 (0.490)	Low (1)	Within site
Native species-rich hedgerow (0.045 km)	Medium (4)	Poor (1)	Low (1)	Standard	1 (0.965)	Low (1)	Within site
Native species-rich hedgerow (0.013 km)	Medium (4)	Poor (1)	Low (1)	Standard	1 (0.965)	Low (1)	Within site

5. RESULTS

The overall comparison of biodiversity units is presented in Table 6 below. The calculator used to derive these figures is provided as a separate appendix (Appendix 2) to this report. With the current layout, there will be a net gain of biodiversity of 19.68% with a positive net change of 0.06 biodiversity units.

Table 6: Results of biodiversity metric calculations

Habitat	Biodiversity units (current)*	Biodiversity units (proposed)*	Biodiversity net-change*	Net percentage change
Habitats	0.29	0.34	0.06	19.68%
Hedgerows	0.55	1.27	0.72	129.61%

* Habitat areas are calculated as biodiversity hectares, hedgerows as biodiversity metres

The largest number of units (0.29 units) is generated by the creation of vegetated gardens. The inclusion of shrub planting and street trees add further small enhancements (0.02 and 0.03 units respectively).

The development is predicted to deliver significant net gains in hedgerow biodiversity units. The existing line of trees on the northern boundary holds the majority of the current biodiversity value (0.41 units) and will be retained within the development. Furthermore, the non-native line of trees on the western boundary will be replaced with a native species-rich hedgerow with trees and is estimated to deliver 0.64 units. Species-rich hedgerows will also be planted on the eastern and southern boundaries, enhancing the ecological connectivity across the site, and an overall 130% increase in hedgerow biodiversity units at Site.

The net gains in biodiversity that are estimated are reliant on the successful restoration and/or creation of habitats *and* their maintenance for the foreseeable future; this is particularly true of the species-rich hedgerow with trees on the western boundary.

6. CONCLUSIONS

The site at Poplars Farm, Hardwick is being proposed for the development of four residential houses with associated gardens, hardstanding access and car parking. The proposals include landscaping throughout the site with several biodiversity enhancement measures, namely species-rich hedgerows, introduced shrubs and street tree planting.

The use of the Defra biodiversity metric to calculate measures of biodiversity for the existing and proposed habitats confirm that the proposed development is likely to lead to a net gain in biodiversity. The net gains in biodiversity that are estimated are reliant on the successful restoration and/or creation of habitats *and* their maintenance for the foreseeable future.

Other ecological features, such as bird and bat boxes, are proposed to be included within development. Whilst not considered within the current DEFRA metric, these features will further enhance the site for priority species and help deliver a sustainable development.

7. REFERENCES

Baker, J., Hoskin, R. & Butterworth., T. (2019) Biodiversity net gain: Good practice principles for development. Part A. A practical guide. CIRIA, UK

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8. APPENDICES

Appendix 1: Assignment of biodiversity metric multipliers

The below tables detail the rationale for the condition assessments made for each habitat type.

Current habitats

Habitat	Condition score	Rationale for condition assessment
Urban - Developed land, sealed surface (Buildings) (0.0328 ha)	N/A – other	No condition assessment required – allocated a score of 0
Urban - Developed land, sealed surface (Hardstanding) (0.0475 ha)	N/A – other	No condition assessment required – allocated a score of 0
Urban - Artificial unvegetated, unsealed surface (0.119 ha)	N/A – other	No condition assessment required – allocated a score of 0
Grassland - Modified grassland (0.0596 ha)	Moderate	Passes 4 of 7 condition assessment criteria (criteria 3, 5, 6 and 7)
Grassland - Modified grassland (0.0249 ha)	Poor	Passes 2 of 7 condition assessment criteria (criteria 3 and 6)

Current hedgerows

Habitat	Condition score	Rationale for condition assessment
Line of trees (0.072 km)	Poor	Passes 2 of 5 condition assessment criteria (2 and 5)
Line of trees (ecologically valuable) (0.051 km)	Moderate	Passes 3 of 5 condition assessment criteria (1,3 and 5)

Proposed habitats

Habitat	Condition score	Rationale for condition assessment
Developed land, sealed surface (Buildings) (0.0482 ha)	N/A – other	No condition assessment required – allocated a score of 0
Developed land, sealed surface (Hardstanding) (0.0656 ha)	N/A – other	No condition assessment required – allocated a score of 0
Developed land, sealed surface (Hardstanding, retained) (0.0656 ha)	N/A – other	No condition assessment required – allocated a score of 0

Habitat	Condition score	Rationale for condition assessment
Vegetated garden (0.1484 ha)	Poor	No condition assessment required – allocated a score of
Introduced shrub (0.0126 ha)	Poor	No condition assessment required – allocated a score of
Urban tree (0.0122 ha)	Poor	Likely to fail the majority of condition assessment criteria

Proposed hedgerows

Habitat	Condition score	Rationale for condition assessment
Native species-rich hedgerow with trees (0.072 km)	Good	Predicted to fail no more than 2 attributes or both attributes in more than one functional group
Native species-rich hedgerow (0.045 km)	Poor	Likely to fail a total of more than 4 attributes and both attributes in more than one functional group (conservative estimate)
Native species-rich hedgerow (0.013 km)	Poor	Likely to fail a total of more than 4 attributes and both attributes in more than one functional group (conservative estimate)
Line of trees (ecologically valuable), retained (0.051 km)	Moderate	Passes 3 of 5 condition assessment criteria (1,3 and 5)

Appendix 2: Biodiversity net gain calculator

As attachment.

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