BIODIVERSITY NET GAIN PLAN

LAND NORTH OF A47 NORMANDY WAY AND WEST OF A447 ASHBY ROAD, HINCKLEY

ON BEHALF OF

RICHBOROUGH

REFERENCE: ZEL_477
DATE: January 2024
V4

30 St Georges square | Worcester |
WR1 1HX
01905 947558

Report Data	
Report Title	Biodiversity Net Gain Baseline
Report Reference	ZEL_477
Client	Richborough
Site	Land north of A47 Normandy Way and west of A447 Ashby Road, Hinckley
Surveyor	E. Seaton BSc (Hons) MCIEEM
Author	E. Seaton BSc (Hons) MCIEEM

Rev	Report	Author	Date Issued
V1	Biodiversity Net Gain Baseline	E. Seaton	19 July 2022
V2	Biodiversity Net Gain Plan	E. Seaton	22 January 2024
V3	Biodiversity Net Gain Plan	E. Seaton	24 January 2024
V4	Biodiversity Net Gain Plan	E. Seaton	01 March 2024

CONTENTS

1.0 INTRODUCTION

Background to the Development

1.1 Zebra Ecology Ltd was commissioned by Richborough Estates to complete a Biodiversity Net Gain Assessment of the land west of Asby Road and north of Normandy Way (A47), Hinckley, Leicestershire (centred on Ordnance Survey grid reference SP 427 959).

1.2 The application site boundary is shown in Figure 1.

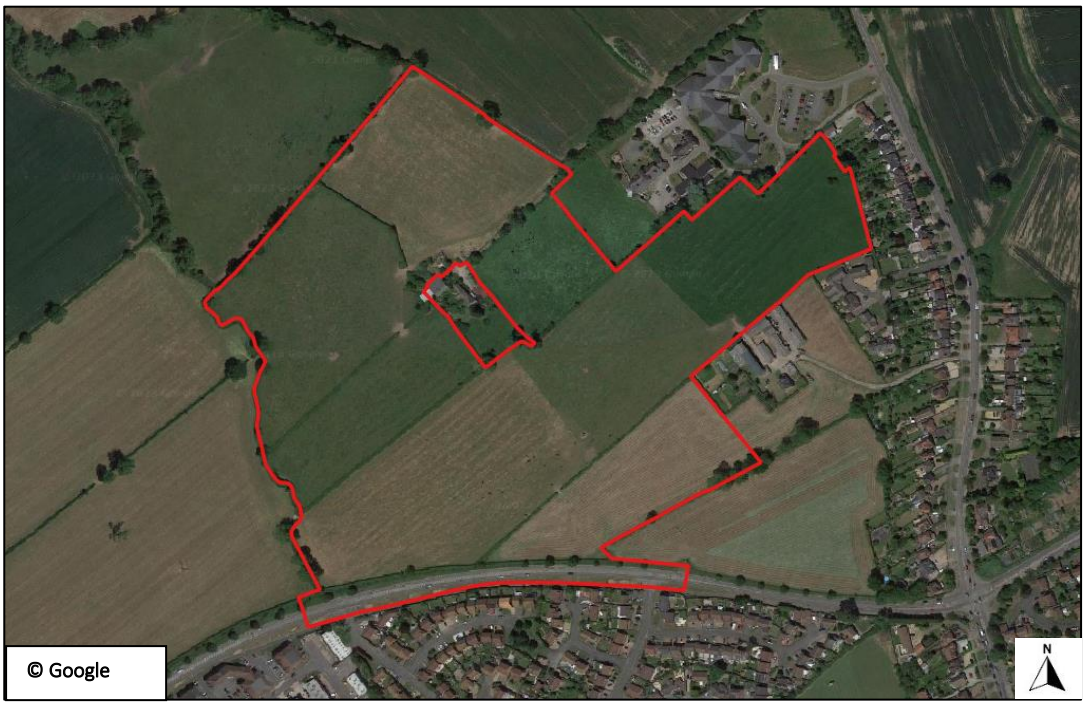


Figure 1: application site boundary

1.1 Planning consent is being sought from Hinckley and Bosworth Council for an '*outline planning application with all matters reserved except for access, for the erection of up to 415 dwellings, associated open space, drainage, landscaping and infrastructure*'.

Objectives

- Classify the type, distinctiveness, condition and strategic significance of existing habitats.
- Calculate baseline for existing habitat and hedgerow units for the site.
- Inform the masterplan in line with applying the mitigation hierarchy in line with Biodiversity Net Gain: Good Practice Principles for Development (Baker et al., 2019).
- Maximise biodiversity net gain through habitat creation and enhancement measures.
- Aim to achieve biodiversity net gain on site where feasible; with off-site measures or purchase of credits considered as an alternative option.

2.0 BIODIVERSITY NET GAIN

2.1 Biodiversity Net Gain (BNG) is defined as 'development that leaves biodiversity in a better state than before, and an approach where developers work with local governance, wildlife groups, landowners and other stakeholders in order to support their priorities for nature conservation'.

2.2 In 2016, the *BNG: Good practice principles for development* was published to support developments across the UK achieve BNG in accordance with good practice. These principles aimed to set a benchmark of '*what good looks like*' and they include the mitigation hierarchy and avoiding impacts of irreplaceable habitats. In 2019, the principles were supplemented with practical guidance on designing, implementing and the long-term maintenance and monitoring of BNG through the project lifecycle.

2.3 Good practice principles for biodiversity net gain are set out within Table 1.1 of Biodiversity Net Gain: Good Practice Principles for Development (Baker et al., 2019):

Table 1: The UK's good practice principles for biodiversity net gain (after Baker, 2016)

Principle	In Practice
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 with the development footprint is not possible or does not generate the most benefits for nature conservation, then offset biodiversity losses by gains elsewhere.
Avoid losing biodiversity that cannot be offset elsewhere	Avoid impacts on irreplaceable biodiversity – these impacts cannot be offset to achieve no net loss / net gain.
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.
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 compensate for the time between the losses occurring and the gains being fully realised.
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.
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 that accounts for the location and timing of biodiversity losses - compensating for losses of one type of biodiversity offsetting by providing a different type that delivers greater benefits for nature conservation - achieving net gain locally to the development whilst 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.
Be additional	Achieve nature conservation outcomes that demonstrably exceed existing obligations i.e. do not deliver something that would occur anyway
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
Optimise sustainability	Prioritise BNG and, where possible, optimise the wider environment benefits for sustainable society and economy
Be transparent	Communicate all net gain activities in a transparent and timely manner, sharing the learning with all stakeholders.

3.0 METHODOLOGY

Condition Assessments

3.1 Condition assessments were completed on 6 and 11 July 2023. Habitat condition was assigned following guidance from the 'Technical Annex 1 and 2' document (Natural England, 2023) to be read in conjunction with Biodiversity Metric 4.0. The condition of each broad habitat type was assessed following this guidance. Full details of condition assessments completed and be seen in Appendix B.

3.2 Botanical quadrat data was collected in randomly selected locations to assess average species per m^2. A total of 35 quadrats (five per field) were placed and separated between fields.

Watercourses

3.3 A condition assessment of the River Tweed tributary, falling within 10m of the application, site was undertaken by E. Seaton BSc (Hons) MCIEEM on 20 and 24 July 2023. The survey assessed both physical features and human modification.

3.4 Prior to the survey, a desktop scoping assessment was completed to determine the number of sub-reaches requiring survey. For the section of the tributary running alongside the site, this consisted of two 50m Modular River Physical (MoRPh5) sub-reaches to comply with guidance requiring a minimum of 20% of the watercourse length (falling within 10m of the redline) to be surveyed. The sub-reaches comprise five 10m survey sections.

3.5 The following survey criteria were assessed: bank top, bank face, channel-water margin and channel bed. A total of 32 River Condition Indicators (RCI), including positive and negative aspects of the watercourse were recorded and inputted into Cartographer software generating numerical values for the 32 RCIs. Positive RCI's score between 0 and 4 and negative scoring -4 and 0. The sum of the indicators informs a Preliminary Condition score for the sub-reach.

3.6 Following the on-site assessment, a MoRPh River Type desk study was completed. The elevation / length of the reach, planform and valley elevation was attained through online geospatial data. Data from the field survey was used to determine average and coarsest bed material sizes. Information was inputted into Catographer software to assign river type. River Type and Preliminary Condition Score are combined to calculate a Final Condition Score.

Strategic Significance

3.7 Strategic significance is used to assess the value of a habitat in relation to its spatial location using published local strategies and objectives for improving biodiversity, including Local Nature Recovery Strategies, local biodiversity plans, National Character Areas objectives, Local Planning Authority Local Ecological Networks, Shoreline Management Plans, estuary strategies and green infrastructure strategies, as per the guidance of the 'User Guide' document (Natural England, 2023).

3.8 The following documents / sources were reviewed to determine the strategic significance of habitats:

- Hinckley and Bosworth Borough Council Local Plan 2016 – 2036
- Hinckley and Bosworth Borough Council - The Good Design Guide Supplementary Planning Document (SPD)
- Hinckley and Bosworth Borough Council Local Development Framework Core Strategy (adopted December 2009)
- Leicestershire Biodiversity Action Plan 2021 – 2031
- The Multi Agency Geographic Information for the Countryside (MAGIC) online database (http://magic.defra.gov.uk).

Measurement of Habitat and Hedgerow Units

3.9 Baseline habitat parcels were measured using habitat mapping and aerial imagery overlain in QGIS. A minimum mapping unit of 25m^2 and 5 linear metres was implemented.

3.10 Survey units for hedgerows have been recorded in line with the Hedgerow Survey Handbook, 2007:

'An end point, or node, is:

1. *any point or connection between two, or more, hedgerows to other features e.g. fences, walls, ditches, roads*
2. *the point at which a hedgerow stops and there is a gap of more than 20m to the next hedgerow (e.g. where the hedgerow ends in the middle of a field)*
3. *the point at which the hedgerow links to a woodland or other semi-natural habitat such as a pond*

There may be significant variation along this length that may require refining lengths into 'survey units'. These additional points where changes occur as follows:

4. *the point at which the hedgerow changes character from one hedgerow type to another for 20m or more*
5. *where there is a distinct change in hedgerow height for lengths of 20m or more*
6. *the ends of lengths (20m or more) of recent planting, coppicing or laying'*

Calculating Biodiversity Units

3.11 The Statutory Biodiversity Metric was used to calculate the baseline (habitat, hedgerow and watercourse units) Baseline assessments have been undertaken by E. Seaton BSc (Hons) MCIEEM *(accredited to undertake the approved field and desk study measures required to generate the River Condition output for Biodiversity Net Gain).*

4.0 RESULTS

Strategic Significance

4.1 Habitats have been assessed for strategic significance in relation to its spatial location using published local strategies.

Table 2: Strategic Significance of Habitats

Resource	Strategic significance of habitats in relation to spatial location	Relevance to application site and habitats
Hinckley and Bosworth Borough Council Local Plan 2016-2039	NAT03 Trees, Hedgerows, Woodlands and Development '*on development sites of 0.5 hectares or more a tree canopy cover of 20% of the site area will be sought. This will principally be achieved through retention and planting of trees*'. The Green Infrastructure Strategy (2020) highlights that given the sparse tree cover within Hinckley & Bosworth outside of the National Forest territory, there is a need to explore opportunities for woodland creation in the Western GI Zone and Southern GI Zone (Figure 5.1 in the Green Infrastructure Strategy 2020).	None – application site outside of Western GI Zone, Southern GI Zone and 'green wedge'. *Tree planting should be targeted within the landscape proposals in line with NAT03.*
Hinckley and Bosworth Borough Council: The Good Design Guide Supplementary Planning Document (SPD)	The National Forest embraces 200 square miles including within Hinckley and Bosworth. The key objective for the National Forest area is to increase woodland cover to about a third of all land within its boundary.	None – application site is outside The National Forest.
Hinckley and Bosworth Local Development Framework Core Strategy	Biodiversity Improvement Areas are specified as part of the strategic green infrastructure plan forming the strategy.	None – application site is outside all Biodiversity Improvement Areas.
The Multi Agency Geographic Information for the Countryside (MAGIC) online database (http://magic.defra.gov.uk).	National Habitat Networks are specified.	None – application site is outside all National Habitat Networks

Table 3: Leicestershire's Biodiversity Action Plan 2021 - 2023

Leicestershire BAP Priority Habitats	
Broadleaved Woodland	Natural Grassland
Wet Woodland	Calcareous Grassland
Lowland Wood Pasture and Parkland	Parks and Open Spaces
Hedgerows	Allotments
Mature Trees	Churchyards
Eutrophic Standing Water	Brownfield Sites
Floodplain Wetland	Built Structures *(covers man-made structures important for lichens)*
Reedbed	

4.1 Taking the above into account the following habitats on-site have been identified as '*being formally identified within local strategy*' (Leicestershire's Biodiversity Action Plan 2021 - 2023):

- Hedgerows (non-native and ornamental hedgerows have been excluded for the purpose of the assessment).
- Mature Trees

Existing On-site Habitats Condition Assessment

4.2 A summary of baseline condition assessments has been provided below. Full condition assessments can be seen in Appendix B with quadrat data (species composition) available within Appendix C. The Preliminary Ecological Appraisal should be referred to for full habitat descriptions.

Grassland

4.3 All fields comprise cattle-grazed modified grassland with <9 species per m^2 present. The vegetation is dominated by fast-growing grasses on fertile, neutral soils. Full condition assessments can be seen in Appendix B with quadrat data (species composition) available within Appendix C.

4.4 The grassland is divided into six main fields. All fields comprise cattle-grazed modified grassland with <9 species per m2 present. The vegetation is dominated by fast-growing grasses on fertile, neutral soils. The sward is dominated by perennial ryegrass *Lolium perenne* with additional species noted such as cock's-foot *Dactylis glomerata,* soft brome *Bromus hordeaceus*, Yorkshire-fog *Holcus lanatus,* timothy *Phleum pratense,* meadow foxtail *Alopecurus pratensis* and common bent *Agrostis capillaris.* Herbaceous species recorded include dandelion *Taraxacum sp*., white clover *Trifolium repens*, creeping thistle *Cirsium arvense*, creeping buttercup *Ranunculus repens,* common chickweed *Stellaria media*, common sorrel *Rumex acetosa*, common mouse-ear *Cerastium fontanum*, creeping cinquefoil *Potentilla reptans* and germander speedwell *Veronica chamaedrys*.

4.5 Field 5 has been separated into sections due to large size and notable change in condition.

Table 4: Grassland Type and Condition

Field	Grassland Type	Grassland Condition
1	Modified Grassland	Poor
2	Modified Grassland	Moderate
3	Modified Grassland	Poor
4	Modified Grassland	Poor
5a	Modified Grassland	Good
5b	Modified Grassland	Poor
5c	Modified Grassland	Poor
6	Modified Grassland	Moderate

Rural Trees

4.6 A crab apple and hawthorn tree (G25) are present within the northern section of Field 5c.

Table 5: Tree Sizes and Condition

Tree	Size	Tree Condition
G25 Crab Apple *Malus sylvestris*	Small	Good
G25 Hawthorn *Crataegus monogyna*	Small	Good

The following trees have also been incorporated within the metric due to proposed loss and >small size (if located within hedgerow) in line with statutory guidance:

Table 6: Tree Sizes and Condition

Tree	Size	Tree Condition
T37 Ash	Large	Good
T57 Horse chestnut	Medium	Good
T68 Ash	Large	Good

Hedgerows

4.1 A total of twenty-three hedgerows are present within the application site. The Preliminary Ecological Appraisal (Zebra Ecology, 2023) should be referred to for full species lists.

Table 7: Hedgerow Descriptions and Conditions

Hedgerow	Description	Condition
H1	Species-rich native hedgerow with trees	Good
H2	Species-rich native hedgerow with trees	Good
H3	Species-rich native hedgerow with trees	Moderate
H4	Species-rich native hedgerow with trees	Good
H5	Native Hedgerow	Moderate
H6	Species-rich native hedgerow with trees	Good
H7	Species-rich native hedgerow with trees	Moderate
H8	Species-rich native hedgerow with trees	Good
H9	Native hedgerow	Good
H10	Species-rich native hedgerow with trees	Moderate
H11	Native hedgerow	Moderate
H13	Species-rich native hedgerow with trees	Moderate
H14	Native hedgerow with trees	Moderate
H15	Species-rich native hedgerow	Moderate
H16	Native hedgerow with trees	Good
H17	Species-rich native hedgerow with trees	Good
H18	Species-rich native hedgerow	Moderate
H19	Native hedgerow	Moderate
H20	Native hedgerow	Moderate
H21	Species-rich native hedgerow with trees	Good
H22	Species-rich native hedgerow with trees	Good
H23	Species-rich native hedgerow with trees	Good
H24	Native hedgerow	Good

Hedgerows 12 and 25 have been omitted due to redline updates.

Other Rivers and Streams

4.2 The MoRPh River Condition survey indicates that the watercourse is a Type K (straight/sinuous). The average score of the positive indicators was 1.316, with -0.923 being the average score for the negative indicators. This gave a Preliminary Condition Score of 0.393, and a final condition score of 'Moderate'.

Table 8: Hedgerow Description and Condition

Hedgerow	Description	Distinctiveness	Condition
1	Other rivers and streams	High	Moderate

On-site Habitat Creation & Enhancement

4.3 Habitat creation has been proposed within open space at the site to maximise biodiversity. A summary of these habitats has been provided below:

- 3.05ha of other neutral grassland in moderate condition
- 0.25ha of traditional orchard in moderate condition
- 0.09ha mixed scrub in poor condition
- 0.09ha of bioswale in moderate condition
- 198 small new trees (within open space) in moderate condition
- 16 small new trees (within bioswale) in poor condition
- 1.07km of new species-rich native hedgerow with trees in moderate condition
- 0.206km of species-rich native hedgerow in moderate condition

- Enhancement of Hedgerow 20 (H20) from native hedgerow to native species-rich hedgerow with trees (12 trees to be added).

Biodiversity Unit Calculations

4.4 The site is formed from 54.04 habitat units, 47.65 hedgerow units and 5.28 watercourse units. Biodiversity impact has been shown within Tables 8-10 below:

Table 9: Habitat Biodiversity Impact

Factor	Habitats
Baseline units	54.04 units
Post-intervention biodiversity units	38.64
Total net unit change	-15.40
Total project biodiversity % change	-28.50%

Table 10: Hedgerow Biodiversity Impact

Factor	Hedgerows
Baseline units	40.29 units
Post-intervention biodiversity units	47.65
Total net unit change	+7.36
Total project biodiversity % change	+18.26%

Table 11: Watercourse Biodiversity Impact

Factor	Hedgerows
Baseline units	5.28 units
Post-intervention biodiversity units	5.28
Total net unit change	0.00
Total project biodiversity % change	0.00%

Watercourse

4.5 Post-intervention changes to the watercourse have been modelled to identify if the proposals will result in a change of condition category. A link road will pass through the watercourse connecting Phase 1 to Phase 2. Open channel outfalls rather than pipes with headwalls are to be utilised. Headwalls will be positioned near SuDS basins with 10m open channels running down to the watercourse to enhance biodiversity. No other changes to the bank face or channel are anticipated.

4.6 The proposals affect the bank top zone (10m from the bank top) which will change from modified to other neutral grassland. Additional tree planting is also proposed in the 10m zone enhancing vegetation structure. Assessment of these changes through Cartographer software has confirmed that changes to the River Condition Assessment score as a result of the proposed landscaping are not significant enough to change the watercourse condition

from its current category (moderate). As the watercourse will retain its moderate conditions, it has been categorised as retained within the metric.

Biodiversity Credits

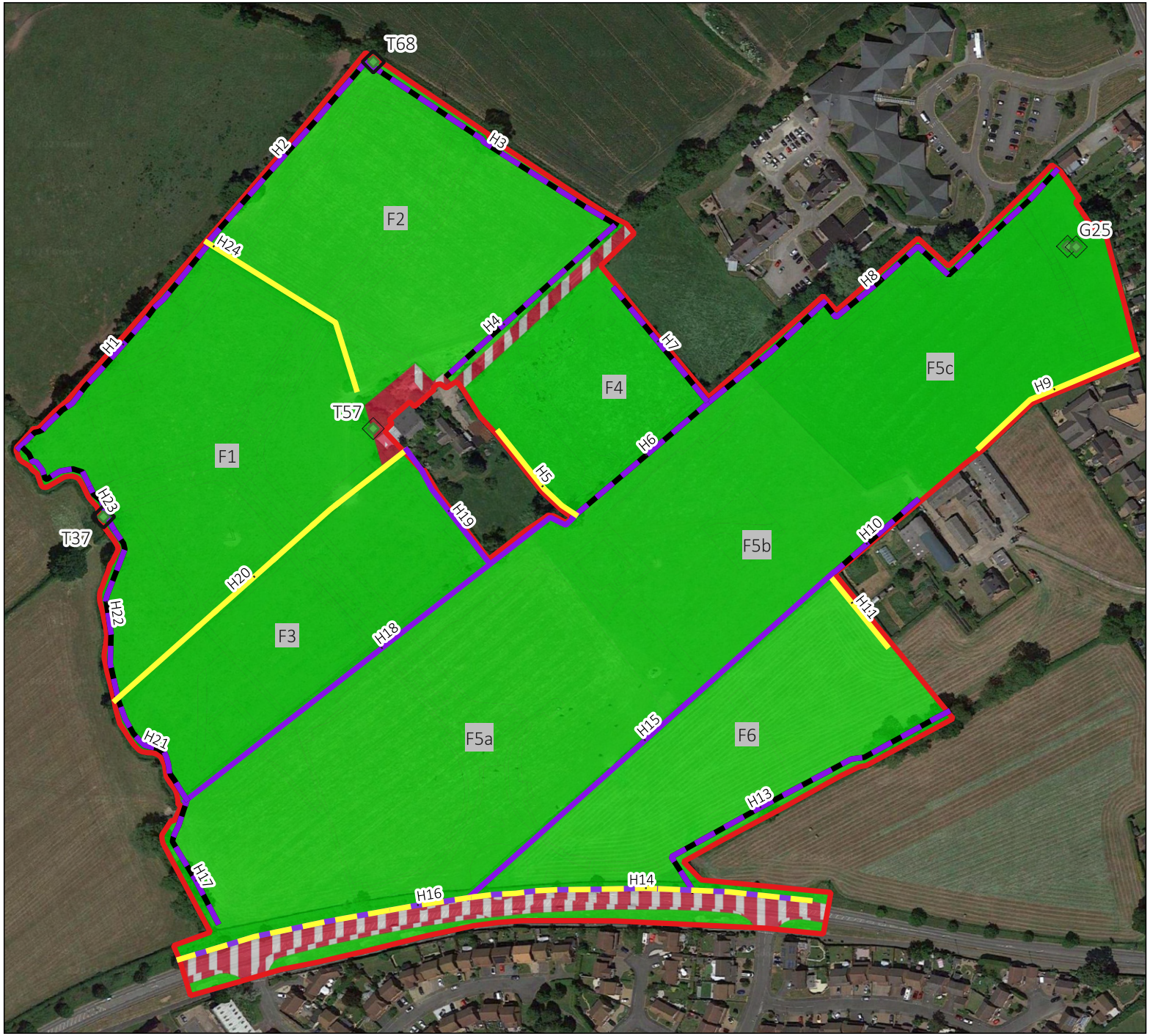
4.7 A biodiversity net gain is to be achieved via the purchase of biodiversity credits with options through various brokers currently being explored. The following credits will be required to afford a +10% net gain:

- **HABITATS:** 20.81 habitat (Tier A1) units
- **HEDGEROWS:** none required
- **WATERCOURSE:** 0.53 watercourse (Tier W) units

APPENDIX A

Plans

- Biodiversity Net Gain Baseline Plan
- Biodiversity Net Gain Post-Development Plan
- Illustrative Landscape Plan



- Application boundary
- Developed land; sealed surface
- Modified grassland
- Vegetated garden
- Native hedgerow
- Native hedgerow with trees
- Species-rich native hedgerow
- Species-rich native hedgerow with trees
- Existing Large Urban Tree
- Existing Medium Urban Tree
- Existing Small Urban Tree

zebra ECOLOGY
30 St Georges Square | Worcester | WR1 1HX
hello@zebraecology.co.uk | 01905 947 558

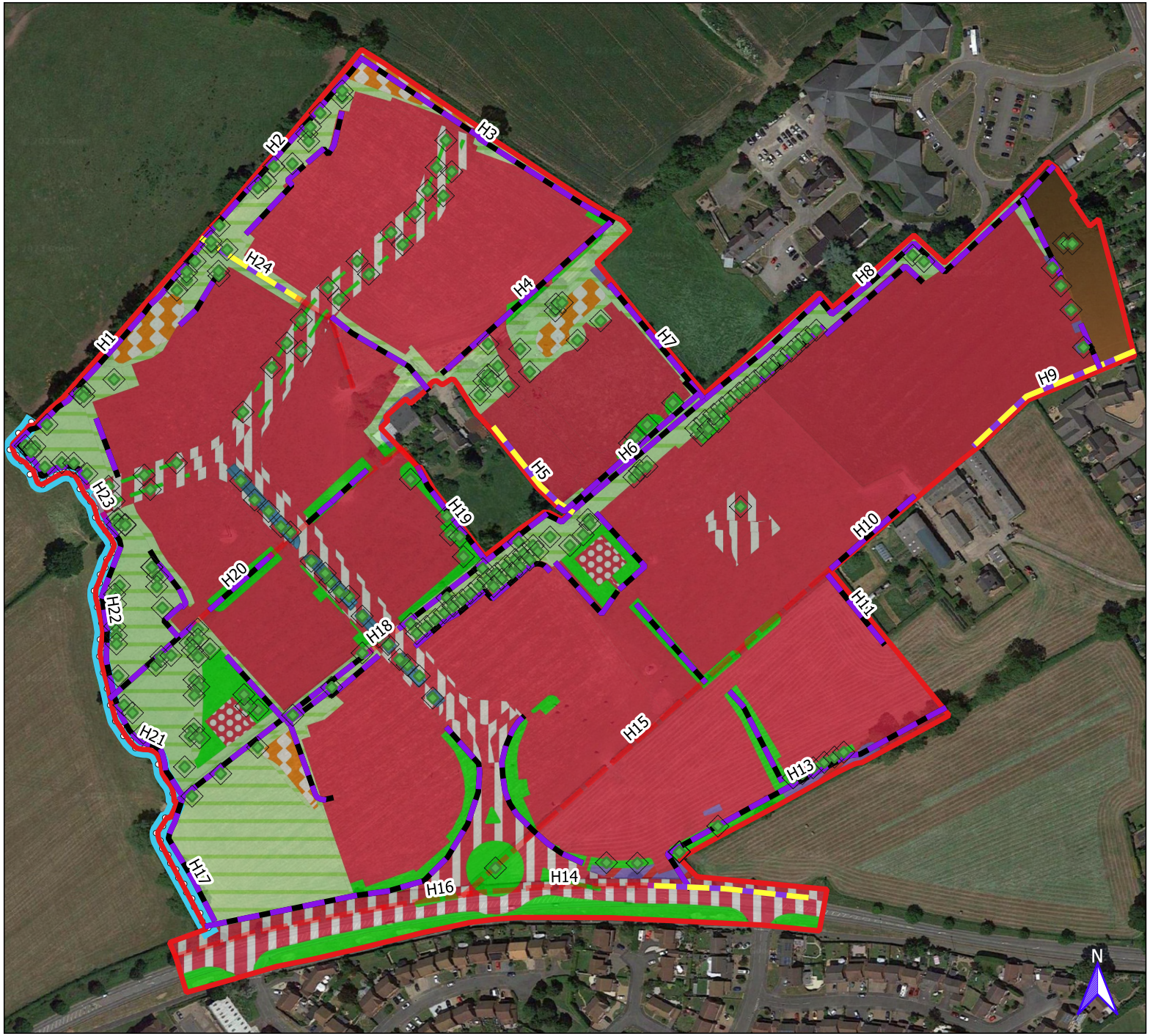
PROJECT
Hinkley North Phase II

DRAWING TITLE
Habitat Plan / Biodiversity Net Gain Baseline

CLIENT
Richborough Estates Ltd

DATE	VERSION
February 2024	3
DRAWING NUMBER	DRAWN BY
ZEL_477_03	ES

0 50 100 m



- Application boundary
- Allotments
- Artificial unvegetated, unsealed surface
- Bioswale
- Developed land; sealed surface
- Introduced shrub
- Mixed scrub
- Modified grassland
- Other neutral grassland
- Traditional orchard
- Development Parcel
- Native hedgerow
- Native hedgerow with trees
- Species-rich native hedgerow
- Species-rich native hedgerow with trees
- Lost hedgerow
- Other rivers and streams
- Proposed Small Urban Tree

ZEBRA ECOLOGY

30 St Georges Square | Worcester | WR1 1HX
hello@zebraecology.co.uk | 01905 947 558

PROJECT
Hinkley North Phase II

DRAWING TITLE
Proposed Habitats Plan

CLIENT
Richborough Estates Ltd

DATE	VERSION
March 2024	3
DRAWING NUMBER	DRAWN BY
ZEL_477_02	ES

0 50 100 m

Illustrative Landscape Masterplan

zebra
LANDSCAPE ARCHITECTS

RICHBOROUGH

ZLA_1467

Normandy Way
Hinckley

L-200

Illustrative Landscape
Masterplan

date December 2023

status Planning

rev **B**

A	Update playgrounds and edit landscaping site wide	17/01/24
B	Update Site Layout n2225 007G	29/02/24

LEGEND

- Boundary
- Existing trees retained
- Existing trees removed
- Existing hedgerows to be removed
- Existing hedgerows to be retained
- Proposed species-rich native hedgerow
- Proposed traditional orchards
- Proposed small native trees in species rich hedgerow
- Proposed individual native trees
- Proposed introduced shrub
- Proposed mixed native scrub
- Proposed vegetated garden
- Proposed modified grassland
- Proposed other neutral grassland (EM3)
- Proposed other neutral grassland (EM10)
- Proposed other neutral grassland (EP1)
- Proposed other neutral grassland (CW6)
- Proposed bioswale
- Proposed allotments

N

scale 1 : 1000 @ A1

0 10 20 30 50 70

30 St. Georges Square | Worcester |WR1 1HX | 01905 947 558
hello@zebralandscapes.co.uk

APPENDIX B

Condition Assessments

Table 12: Grassland – Low Distinctiveness. Condition Assessment Criteria

Condition Assessment Criteria	
A	There must be 6-8 species per m^2 present, including at least two forbs (this may include those listed in Footnote 1). **Note – this criterion is essential for achieving Moderate or Good condition.** Where the vascular plant species present are characteristic of medium, high or very high distinctiveness grassland, or there are 9 or more of these characteristic species present (excluding those in Footnote 1), please review the full UKHab description to assess whether the grassland should instead be classified as a higher distinctiveness grassland. Where a grassland is classed as medium, high or very high distinctiveness, please use the relevant condition sheet.
B	Sward height is varied (at least 20% of the sward is less than 7 cm and at least 20 per cent is more than 7 cm) creating microclimates which provide opportunities for vertebrates and invertebrates to live and breed.
C	Some scattered scrub (including bramble *fructicosus* agg.) may be present, but scrub accounts for less than 20% of total grassland area. Note - patches of shrubs with continuous (more than 90%) cover should be classified as the relevant scrub habitat type.
D	Physical damage evident in less than 5% of total grassland area. Examples of physical damage include excessive poaching, damage from machinery use or storage, erosion caused by high levels of access, or any other damaging management activities.
E	Cover of bare ground between 1% and 10%, including localised areas (for example, a concentration of rabbit warrens)[2].
F	Cover of bracken *Pteridium aquilinum* is less than 20%.
G	There is an absence of invasive non-native species (Footnote 3; as listed on Schedule 9 of WCA, 1981[4]).

Footnote 1 – Creeping thistle *Cirsium arvense*, spear thistle *Cirsium vulgare*, curled dock *Rumex crispus*, broad-leaved dock *Rumex obtusifolius*, common nettle *Urtica dioica*, creeping buttercup *Ranunculus repens*, greater plantain *Plantago major*, white clover *Trifolium repens* and cow parsley *Anthriscus sylvestris*.

Footnote 2 – For example, this could include small, scattered areas of bare ground allowing establishment of new species, or localised patches where not exceeding 10% cover.

Footnote 3 – Assess this for each distinct habitat parcel. If the distribution of invasive non-native species varies across the habitat, split into parcels accordingly, applying a buffer zone around the invasive species with a size relative to its risk of spread into adjacent habitat, using professional judgement.

Footnote 4 – Wildlife and Countryside Act 1981

Condition Assessment Result	Condition Assessment Score
Passes 6 or 7 of 7 criteria including passing essential criterion A	Good
Passes 4 or 5 criteria including passing essential criterion A.	Moderate
Passes 3 or fewer criteria; OR Passes 4-6 criteria (excluding criterion A)	Poor

Table 13: Grassland – Low Distinctiveness. Assessment Results

Habitat	Criteria							Score
	A	B	C	D	E	F	G	
Field 1	N	N	Y	Y	N	Y	Y	Poor
Field 2	Y	N	Y	Y	N	Y	Y	Moderate
Field 3	N	N	Y	Y	N	Y	Y	Poor
Field 5a	Y	N	Y	Y	Y	Y	Y	Good
Field 5b	N	N	Y	Y	Y	Y	Y	Poor
Field 5c	N	Y	Y	Y	N	Y	Y	Poor
Field 6	Y	N	Y	Y	N	Y	Y	Moderate

Table 14: Individual Trees Condition Assessment Criteria

Condition Assessment Criteria	
A	The tree is a native species (or at least 70% within the block are native species).
B	Tree canopy is predominantly continuous with gaps in canopy cover making up <10% of total area and no individual gap being >5 m wide (individual trees automatically pass this criterion).
C	The tree is mature (or more than 50% of the block are mature).
D	There is little or no evidence of an adverse impact on tree health by human activities (such as vandalism or herbicide use). And there is no current regular pruning regime, so the trees retain >75% of expected canopy for their age range and height.
E	Natural ecological niches for vertebrates and invertebrates are present, such as presence of deadwood, cavities, ivy or loose bark.
F	More than 20% of the tree canopy area is oversailing vegetation beneath.
Condition Assessment Result	**Condition Assessment Score**
Passes 5 or 6 of 6 criteria	Good
Passes 3 or 4 of 6 criteria	Moderate
Passes 0, 1, or 2 of 6 criteria	Poor

Table 15: Individual Tree Assessment Results

Tree	Criteria						Score
	A	B	C	D	E	F	
G25 Crab Apple *Malus sylvestris*	Y	Y	Y	Y	Y	Y	Good
G25 Hawthorn *Crataegus monogyna*	Y	Y	Y	Y	Y	Y	Good
T37 Ash *Fraxinus excelsior*	Y	Y	Y	Y	Y	Y	Good
T57 Horse chestnut *Aesculus hippocastanum*	Y	Y	Y	Y	N	Y	Good
T68 Ash *Fraxinus excelsior*	Y	Y	Y	Y	Y	Y	Good

Table 16: Hedgerow Condition Assessment Criteria

Attribute	Criteria	Description
A1. Height	>1.5 m average along length	The average height of woody growth estimated from base of stem to the top of shoots, excluding any bank beneath the hedgerow, any gaps or isolated trees. Newly laid or coppiced hedgerows are indicative of good management and pass this criterion for

		up to a maximum of four years (if undertaken according to good practice). A newly planted hedgerow does not pass this criterion (unless it is > 1.5 m height).
A2. Width	>1.5 m average along length	The average width of woody growth estimated at the widest point of the canopy, excluding gaps and isolated trees. Outgrowths are only included in the width estimate when they are >0.5m in height. Laid, coppiced, cut and newly planted hedgerows are indicative of good management and pass this criterion for up to a maximum of four years (if undertaken according to good practie).
B1. Gap – hedge base	Gap between ground and base of canopy <0.5 m for 90% of length (unless 'line of trees')	This is the vertical 'gappiness' of the woody component of the hedgerow, and its distance from the ground to the lowest leafy growth. Certain exceptions to this criterion are acceptable (see page 65 of the Hedgerow Survey Handbook).
B2. Gap – hedge canopy continuity	· Gaps make up <10% of total length and · No canopy gaps >5 m	This is the horizontal 'gappiness' of the woody component of the hedgerow. Gaps are complete breaks in the woody canopy (no matter how small). Access points and gates contribute to the overall 'gappiness', but are not subject to the >5m criterion (as this is the typical size of a gate).
C1. Undisturbed ground and perennial vegetation	>1m width of undisturbed ground with perennial herbaceous vegetation for >90% of length: · measured from outer edge of hedgerow, and · is present on one side of the hedge (at least)	This is the level of disturbance (excluding wildlife disturbance) at the base of the hedge. Undisturbed ground should be present for at least 90% of the hedgerow length greater than 1m in width and must be present along at least one side of the hedge. This criterion recognises the value of a hedge base as a boundary habitat with the capacity to support a wide range of species. Cultivation, heavily trodden footpaths, poached ground etc. can limit available habitat niches.
C2. Undesirable perennial vegetation	Plant species indicative of nutrient enrichment of soils dominate <20% cover of the area of undisturbed ground	The indicator species used are nettles *Urtica spp.,* cleavers *Galium aparine* and docks *Rumex spp.* Their presence, either singly or together does not exceed 20% cover threshold.
D1. Invasive and	90% of the hedgerow and undisturbed ground is free of invasive non-native species (including those on Schedule 9	Recently introduced species refer to plants that have naturalised in the UK since AD 1500 (neophytes). Archaeophytes count as natives.

neophyte species	of WCA) and recently introduced species.	For information on neophytes see the JNCC website, as well as the BSBI website where the 'Online Atlas of the British and Irish Flora' contains an up-to-date list of the status of species. For information on invasive non-native species see the GB Non-Native Secretariat website.
D2. Current Damage	90% of the hedgerow or undisturbed ground is free of damage caused by human activities	This criterion addresses damaging activities that may have led to or lead to deterioration in other attributes. This could include evidence of pollution, piles of manure or rubble, or inappropriate management practices (e.g. excessive hedge cutting).
Additional group – applicable to hedgerow trees only		
E1. Tree class	At least one mature tree per 30m stretch of hedgerow. A mature tree is one that is at least 2/3 expected fully mature height for the species.	This criterion addresses if there are sufficient mature trees (within the scope of planning timescales) which are of higher value to biodiversity.
E2. Tree health	At least 95% of hedgerow trees are in healthy condition (excluding veteran features valuable for wildlife). There is little or no evidence of an adverse impact on tree health by damage from livestock or wild animals, pests or diseases, or human activity.	This criterion identifies if the trees are subject to damage which compromises the survival and health of the individual specimens.
Condition Assessment for Hedgerows without Trees		
Condition Assessment Result		Condition Assessment Score
No more than 2 failures in total; **AND** No more than 1 failure in any functional group.		Good
No more than 4 failures in total; **AND** Does not fail both attributes in more than one functional group e.g. fails attributes A1, A2, B1 and C2 = Moderate condition).		Moderate
Fails a total of more than 4 attributes; **OR** Fails both attributes in more than one functional group (e.g. fails attributes A1, A2, B1 & B2 = Poor condition).		Poor
Condition Assessment for Hedgerows with Trees		
Condition Assessment Result		Condition Assessment Score
No more than 2 failures in total; **AND** No more than 1 failure in any functional group.		Good
No more than 5 failures in total **AND** Does not fail both attributes in more than one functional group (e.g. fails attributes A1, A2, B1, C2 and E1 = Moderate condition).		Moderate
Fails a total of more than 5 attributes; **OR**		Poor

Fails both attributes in more than one functional group (e.g. fails attributes A1, A2, B1 & B2 = Poor condition).	

Table 17: Hedgerow Assessment Results

Habitat	Criteria										Score
	A1	A2	B1	B2	C1	C2	D1	D2	E1	E2	
H1	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Good
H2	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Good
H3	Y	Y	Y	Y	N	Y	Y	Y	N	N	Moderate
H4	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Good
H5	Y	N	Y	Y	N	Y	Y	N	N/A		Moderate
H6	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Good
H7	Y	Y	Y	Y	N	Y	Y	N	N	Y	Moderate
H8	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Good
H9	Y	Y	Y	Y	N	Y	Y	N	N/A		Good
H10	Y	Y	Y	Y	N	Y	Y	N	N	Y	Moderate
H11	Y	N	Y	Y	N	Y	Y	N	N/A		Moderate
H13	Y	N	Y	Y	N	Y	Y	Y	N	Y	Moderate
H14	Y	Y	Y	Y	N	N	Y	Y	N/A		Moderate
H15	Y	Y	Y	Y	N	N	Y	N	N	Y	Moderate
H16	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Good
H17	Y	Y	Y	Y	N	Y	Y	Y	N/A		Good
H18	Y	Y	Y	Y	N	N	Y	N	N/A		Moderate
H19	Y	Y	Y	Y	N	N	Y	Y	N/A		Moderate
H20	Y	Y	Y	Y	N	N	Y	N	N	Y	Moderate
H21	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Good
H22	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Good
H23	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Good
H24	Y	Y	Y	Y	N	Y	Y	Y	N/A		Good

Hedgerows 12 and 25 have been omitted due to redline updates.

Quadrat Data

Table 18: Quadrat Data

Quadrat Data	
Field	Number of Species per m^2 for each quadrat and average for each field
1	Q1 (5), Q2, (5), Q3 (4), Q4 (5), Q5 (5) / 5 = AVERAGE 4.8 species per m^2
2	Q1 (5), Q2, (6), Q3 (6), Q4 (7), Q5 (6) / 5 = AVERAGE 6 species per m^2
3	Q1 (3), Q2, (5), Q3 (4), Q4 (4), Q5 (5) / 5 = AVERAGE 4.2 species per m^2
4	Q1 (4), Q2, (4), Q3 (5), Q4 (5), Q5 (4) / 5 = AVERAGE 4.4 species per m^2
5a	Q1 (7), Q2, (7), Q3 (6), Q4 (7), Q5 (6) / 5 = AVERAGE 6.6 species per m^2
5b	Q1 (5), Q2, (4), Q3 (5), Q4 (5), Q5 (4) / 5 = AVERAGE 4.6 species per m^2
5c	Q1 (5), Q2, (5), Q3 (5), Q4 (5), Q5 (4) / 5 = AVERAGE 4.8 species per m^2
6	Q1 (8), Q2, (7), Q3 (8), Q4 (7), Q5 (8) / 5 = AVERAGE 7.6 species per m^2

Table 19: River Condition Assessment Indicator Scores

River Tweed Watercourse	Condition Indicator Scores

Bank top vegetation structure	1
Bank top tree feature richness	0
Bank top water-related features	0
Bank top NNIPS cover	0
Bank top managed ground cover	-3
Bank face riparian vegetation structure	2
Bank face tree feature richness	0
Bank face natural bank profile extent	3
Bank face natural bank profile richness	2
Bank face natural bank material richness	1
Bank face bare sediment extent	1
Bank face artificial bank profile extent	-1
Bank face reinforcement extent	0
Bank face reinforcement material severity	0
Bank face NNIPS cover	0
Channel margin aquatic vegetation extent	1
Channel margin aquatic morphotype richness	1
Channel margin physical feature extent	3
Channel margin physical feature richness	2
Channel margin artificial features	0
Channel aquatic morphotype richness	2
Channel bed tree features richness	0
Channel bed hydraulic features richness	1
Channel bed natural features extent	1
Channel bed natural features richness	1
Channel bed material richness	3
Channel bed siltation	-2
Channel bed reinforcement extent	-2
Channel bed reinforcement severity	-2
Channel bed artificial features severity	-2
Channel bed NNIPS extent	0
Channel bed filamentous algae extent	0
Preliminary Condition Score	**0.393**
Condition	**Moderate**

APPENDIX C

Qualifications and Experience

Zebra Ecology Ltd is Registered Practice of the Chartered Institute of Ecology and Environmental Management (CIEEM). A comprehensive range of ecological services are offered including Preliminary Ecological Appraisal (PEA), Ecological Impact Assessment (EcIA), Habitat Regulations Assessment (HRA), Biodiversity Impact Assessment (BIA) and European Protected Species (EPS) Surveys / Licensing.

The practice works closely work closely with clients to achieve their aspirations alongside securing the best outcomes for the environment. With wildlife legislation and policy as its basis; commercial awareness, pragmatism and defensible advice is combined to form Zebra Ecology's approach.

As well as offering a wide range of ecological services, Zebra Ecology forms part of Zebra Group offering an in-house collaborative approach in conjunction with Zebra Architects, Zebra Landscape Architects, Zebra Trees and Zebra Land and Development.

Emma Seaton BSc (Hons) MCIEEM

Emma holds a BSc (Hons) degree in Biology from the University of Sheffield and has since gained a postgraduate certificate in Ecological Consultancy. Her ecological experience includes Preliminary Ecological Appraisals, Ecological Impact Assessments (EcIA), surveying for notable / European Protected Species, mitigation / licensing advice and Biodiversity Net Gain (BNG) Assessments. She is accredited to undertake the approved field and desk study methods required to generate the River Condition outputs for BNG. She has held Natural England survey licences for bats (Class 2), great crested newts and white-clawed crayfish since 2015. She is also a Registered Consultant under the Bat Mitigation Class Licence (BMCL) licence and an Earned Recognition consultant under the bat mitigation pilot project. Emma is a Full member of the Chartered Institute of Ecology and Environmental Management.